PAGES MISSING WITHIN THE BOOK ONLY

UNIVERSAL
LIBRARY

OU_156433

UNIVERSAL
LIBRARY

OSMANIA UNIVERSITY LIBRARY

Call No. 651.3/L49T Accession No. 24555

Author Lewis Boyington, and Robinson.

Title Text book of office Management.

This book should be return ed on or before the date last marked below.

TEXTBOOK
of
OFFICE MANAGEMENT

This book is produced in full compliance with the government's regulations for conserving paper and other essential materials.

SUBJECT INDEX FOR FILING MATERIAL ON OFFICE MANAGEMENT

I. *The function of office management*
II. *Analyzing the work to be done (preliminary analysis)*
  A. What is the nature of the work to be done?
  B. How much of each kind of work is there to be done?
  C. How much of each kind of work can one worker do?
  D. How much time is available for doing the work?
  E. How many workers will be needed to do the work?
III. *Laying out the work (planning and scheduling)*
  A. Determining how the work shall be done
  B. Routines
  C. Equipment
  D. Scheduling the work
IV. *Building the organization to do the work (personnel)*
  A. Analyzing the requirements
  B. Planning the organization
  C. Standardization of personnel
  D. Employment procedure
  E. Training and developing office employees
  F. Compensation of office employees
  G. Nonfinancial incentives
  H. Essential personnel records
V. *Directing and controlling the organization*
  A. Determining who shall do the work that is to be done
  B. Exercising supervision
  C. Assigning the work to competent individuals
  D. Control
VI. *Supplying services needed by the organization*
  A. Stationery and supplies
  B. Mail and messenger
  C. Telephone switchboard
  D. Stenographic and transcribing service
  E. Duplicating service
  F. Filing service
  G. Central correspondence department
  H. Maintenance and repair of equipment
  I. Providing good working conditions
  J. Other services
VII. *Improvement work in the office*
  A. Office surveys
  B. Analysis and study of present methods
  C. Laying down a program of improvement work
  D. Selling the organization on the proposed plans
VIII. *Branch office work and control*
IX. *Office building location and design*
X. *Sources of information on office management*
  A. Books
  B. Magazines and periodicals
  C. Reports
  D. Proceedings
  E. Management Societies
  F. Miscellaneous references

TEXTBOOK

of

OFFICE MANAGEMENT

BY

WILLIAM HENRY LEFFINGWELL

Late President, National Office Management Association and The Taylor Society; Member, Association of Consulting Management Engineers, Society for the Advancement of Management, and Associate of American Society of Mechanical Engineers; Author of "Scientific Office Management," "Office Management, Principles and Practice," Etc.

AND

EDWIN MARSHALL ROBINSON

Professor of Management, Boston University College of Business Administration; Member, National Office Management Association, Society for the Advancement of Management, American Management Association; Formerly General Office Manager, B. Kuppenheimer & Company, The Liquid Carbonic Company; Author of "Training for the Modern Office," "Office Appliance Operation," "Notes in Business Management," Etc.

SECOND EDITION
SIXTH IMPRESSION

McGRAW-HILL BOOK COMPANY, INC.
NEW YORK AND LONDON
1943

TEXTBOOK OF OFFICE MANAGEMENT

COPYRIGHT, 1932, 1943, BY THE
McGRAW-HILL BOOK COMPANY, INC.

PRINTED IN THE UNITED STATES OF AMERICA

All rights reserved. This book, or parts thereof, may not be reproduced in any form without permission of the publishers.

THE MAPLE PRESS COMPANY, YORK, PA.

To

THE NATIONAL OFFICE
MANAGEMENT ASSOCIATION

PREFACE TO THE SECOND EDITION

With the rapidly mounting volume of office work now being done, and the equally rapid increase in the number of office workers required to do it, effective office management is needed more than ever, for two reasons:

First, to be sure that the work is done quickly and well.

Second, to eliminate unnecessary work which causes delays and increases expenses without justification.

The office manager's task, then, is to get the office work done well, quickly, and at a reasonable cost. To be able to do this, he must know:

1. How to analyze the office requirements of the organization he is serving.
2. How to plan and lay out the work to be done.
3. How to select and assign competent office workers to do the work.
4. How to direct and instruct them in their duties.
5. How to control all the office operations for which he is responsible.
6. How to control and keep down the expense of all these items.

There is no room here for stumbling, for "trial-and-error" solutions. There is a pressing need for swift, sure-footed attack, for clear thinking, and for positive, intelligent action. More than ever is there a need for trained office managers who are able to apply the principles of management to the problems confronting them.

The problem of teaching office management revolves around two factors: determining the best order of presentation, and then presenting the material so that it may not be too difficult to understand, absorb, and master. Mastery of the subject is essential for the best results. Why try for anything less?

As a further aid to this mastery, nearly seven hundred questions have been prepared, covering adequately and searchingly

PREFACE TO THE FIRST EDITION

The principles outlined in this work are the result of a long experience in "the harness" both as a clerical worker and, later, as an office manager. They were, for the most part, formulated some fifteen or twenty years ago and have been tested by a long and varied practice as consulting management engineer. This long trial has not caused any variation in their essentials, and while they are exemplified in most of my other writings on the subject, they are here presented in a more concise form, being especially adapted as a textbook for use in business schools and colleges. It may be mentioned here that, in all the years that have passed, they have never been called in question by office managers, who have found them invariably successful when put into actual practice.

This result of course might be expected, as they are, in essence, but the principles of scientific management formulated by that famous industrial scientist, Frederick Winslow Taylor, here applied to the conduct of the clerical office, and, like all scientific principles, they have naturally demonstrated their universal applicability.

Despite the current popular opinion that the office manager needs to know only a lot of systems and machines, there is an ever-growing group of executives who believe that the management of an office is quite as important a job as the management of a factory or any other industrial enterprise. Numerous instances may be cited where the managers of large offices have, by a consistent and logical use of these principles, saved upward of $100,000 a year for their companies.

The young man entering business today need have no hesitancy in preparing himself for the position of office manager, for that position has proved a stepping stone to offices of great responsibility for many of our present leading executives.

To the student I leave the thought, originally, I believe, expressed by Aristotle, that "what we have to learn, we learn by doing." He should grasp every opportunity to visit offices and

observe what goes on. He should eagerly accept a clerical position. If he is alert he will find, even in the best managed offices, violations of some of the principles here enunciated (for no office is perfect) which, if corrected, would result in better service or more economical management or both. Let him not too hastily criticize, however, for a few diplomatic questions will show him that the correction of such violations is by no means a simple matter, but requires research, time, patience, and often a high degree of executive management. To discover a fault is easy; to correct it is often very difficult.

WILLIAM HENRY LEFFINGWELL.

WESTFIELD, N. J.,
December, 1931.

CONTENTS

		Page
Preface to the Second Edition		vii
Preface to the First Edition		xi
I.	The Relation of the Office to General Business	1
II.	The Modern Conception of Office Management	19
III.	Organization, Administration, Management, and Control	38
IV.	Office Routines and Their Construction	58
V.	Flow of Work	76
VI.	Facilitating the Performance of Work—Office Service—Mail and Messenger	83
VII.	Correspondence and Transcribing	104
VIII.	Office Records and Filing	125
IX.	Forms and Form Design	144
X.	Stationery and Office Supplies	164
XI.	Office Desks and Desk Systems	178
XII.	Office Machinery	194
XIII.	Machines for Calculation	213
XIV.	Providing Office Space	222
XV.	Working Conditions	238
XVI.	Office Arrangement	258
XVII.	The Office Worker and His Job	276
XVIII.	Employee Testing	296
XIX.	Employment and Training	315
XX.	Compensation of Office Employees	337
XXI.	Scientific Analysis	357
XXII.	The Measurement of Office Work	373
XXIII.	The Setting of Standards	392
XXIV.	Planning and Scheduling Office Work	411
XXV.	Keeping Office Expense Down	431
Index		447

TEXTBOOK OF OFFICE MANAGEMENT

I

THE RELATION OF THE OFFICE TO GENERAL BUSINESS

Office management, as a function, is concerned with the efficient performance of office work, whenever and wherever that office work is to be done. Office work is concerned *primarily* with the records of the enterprise—making records, using records, and preserving them for future reference. These records may be the history of transactions of the enterprise, represented by the accounts, by correspondence, by contracts, by orders, by inventories, by plans and schedules, by reports, and by written and printed memorandums of all kinds.

These records may be made by hand or by machine. They may be made in a place called "the office," or they may be made anywhere else. No matter where the record is made or who makes it, it is office work. Sometimes the term "clerical" is used synonymously with the term "office" to indicate the fact that the work is clerical work, whether it is done by a clerk in a place called "the office," by the foreman in a factory, or by a salesman on the road. The essential feature is the work itself, not who does it or where it is done. If it is clerical work in one place, it is clerical work everywhere.

Likewise, the person responsible for seeing that the office work is done is exercising the office-management function, whether he is called the office manager, the chief clerk, the department head, or the supervisor of a section. It is obvious that, although the office-management function may be exercised by many different

persons in an enterprise, only a very few individuals in the concern can be expected to have a mastery of the science of office management. Lacking this mastery, the efficient performance of office work would seem to be largely a hit-or-miss proposition.

Other Kinds of Office Work

Although, as has been stated above, office work is concerned primarily with records, there are collateral tasks that are also included in the term "office work." These collateral tasks include communication between individuals in the enterprise (through conferences, interviews, telephone calls, instructions, memorandums) and communication between the enterprise and outsiders (through letters, telephone calls, telegrams, orders, personal calls, and so forth). Records often form the basis of communication and always result from communication.

Another important task included in office work is planning, which may embrace scheduling. Planning is an attempt to lay out a program of action; scheduling, in management practice, is concerned with the times and places at which the events are to take place. Both are usually based upon records available.

Statistical work, so called, is also office work, based as it is upon records, without which there could be no statistics. The statistical work of an enterprise may comprise merely a combination of figures and the compilation of facts into a summary report; or it may involve the preparation of comprehensive reports accompanied by charts and diagrams, together with an analytical interpretation and possibly recommendations for action. Since statistics are useful only if they are timely, the effective organization of the statistical work is necessary, to avoid undue cost and expensive overtime, in order to present the statistics in time to be of use.

Computing is also office work. Prices have to be checked, costs have to be compiled, sales analyzed, pay rolls reckoned, and so forth.

Office work, then, is concerned with records and statistics, with communication, with computing, with planning and scheduling. Every office task comes within the scope of one or other of these activities. But it is often difficult to recognize at once the primary function involved.

The Three Types of Office Work

If further analysis is made of the manner in which these activities are performed, it will be found that all office work may be divided into three simple, yet fundamental, tasks:

1. Writing or interviewing.
2. Computing.
3. Classifying and filing.

In many forms of these activities the ingenuity of inventors and engineers has greatly expedited many office tasks by the invention and application of machines and devices of various kinds, but the student should constantly bear in mind that without exception they all are included within one or another of the three fundamental tasks mentioned above.

The Office as a Linking Activity of Business

A brief consideration of the three fundamental office tasks will show that clerical work permeates each and every activity in business, and therefore the office is inseparably bound up with all business activities. If all this clerical work is regarded as a mere heterogeneous mass of duties, the task of controlling them may well seem impossible; but if regarded as the linking, connecting, or coordinating function in production and distribution, the possibility of their control is immediately perceptible. It naturally follows that it should function with the least amount of effort, which in turn means that it should be under the exclusive charge of a specialist who has given his entire attention to the conduct of clerical activities if only from the viewpoint of regarding them as linking factors in production and distribution. To place in the position of manager of works or sales a person who has not been trained in the work or has not made it his special study would obviously be an economic waste. But it is equally a waste to endeavor to have the office function directed as a side line by an individual who is not trained in it and has no special interest in it, no matter how eminently fitted he may be to perform his own individual specialty.

In short, the purpose of the office is to furnish clerical service to all in the business who may have need of it. This, as we have

seen, is not only an economically useful service but, considering our present system of production and distribution, an economically indispensable one.

Is Office Work Nonproductive?

Is office work really nonproductive? Can a clerk making entries on a card or in a book, or a messenger carrying a piece of paper from one person to another, be considered to have actually produced anything? Can the product of their labor be clearly defined? It is not only easy to assume that it cannot, but as a matter of fact, for many years, business men have maintained that all such workers were actually nonproducers. If this is so, there is certainly something wrong with the conditions that create these "nonproducers" in ever-increasing numbers; and if it is not so, it is equally certain that the logic that classes the clerk as a nonproducer is at fault. Let us, therefore, try to clarify this question as much as possible, for it is of the highest importance.

A clerk making entries on a card may be producing a valuable and important record, without which the business cannot continue, or he may be simply spoiling an otherwise perfectly good piece of bristol board. A typist may be writing either an important business communication or a personal letter for one of the executives. In both cases the workers are employed upon the legitimate tasks for which they were engaged and may be doing a perfectly conscientious job and honestly endeavoring to earn their salaries. To identify the product of the office worker, we must, therefore, look beyond the particular piece of work done and consider the result that is accomplished. If there is no result there is no product, exactly as a rejected manuscript or cartoon ceases to be a product when it cannot serve as raw material for the finished product for which it was intended. In this case, the clerk is certainly a nonproducer. But if a useful result is accomplished, if the work of the clerk passes on to future stages where it is used and where it functions as the necessary raw material for another finished product, or desired result, then the clerk is as truly a producer as is the miller who converts the grain into flour, and his work is in the same sense productive.

What Constitutes Its Products

The product of office work, then, is a certain desired—and therefore presumably useful—result. We should also understand clearly that the test of a result of office work of any kind is that it must serve to link operations in production, sales, finance, or accounting, and do so economically; that is, that the expense of the linking shall not exceed its value. It is easily possible to facilitate one or more of these primary functions of business, but at a prohibitive expense. Such work might be compared to the digging of a hole in a quicksand—the digger might labor vigorously, but, since no hole would result, there would be no product. A cabinetmaker may make a poor table, yet he has still produced something, though it is an inferior article; and in like manner the work of a clerk may produce an inferior facilitating effect upon any of the business functions mentioned. But if he totally fails to link or connect or if it costs more to do so than it is worth, then he has failed to produce anything. His work is as useless as that of the author whose manuscript is never printed, or the cartoonist whose drawing is never published. He has failed in the production of the one thing that can be defined as his product—the facilitation of any business function.

To summarize the matter:

1. The result must be desired, which means that it must have been anticipated and believed to be advantageous.

2. It must make possible, or easier, the performance of one of the primary functions of business.

3. It must do this economically; that is, at a cost which the function (measured by standards fixed by competition) can bear. This does not necessarily mean that the one best way must be used, for a method may be economical and yet cost more than another way. In the long run, however, competition fixes the price which that function can afford to pay for its facilitation.

Some Original Thinking Necessary

We have dwelt upon this subject at some length, for the reason that it is becoming ever more imperative for business men, and especially office managers, to begin to do some original thinking on this question of the product of office work. Not enough offices are so well conducted as to lead an observer to

believe that the subject had been considered at all. In many cases the organization of the ordinary business office seems to be based on the easy assumption that certain traditional records are needed, an assumption which may or may not be true, according to circumstances. There must be bookkeepers, stenographers, clerks, and file clerks, and it is taken for granted that the bookkeepers must keep books, the stenographers type letters, the clerks make entries, and the file clerks file material. But when this easy assumption is carried a little further, and it is put up to someone to decide just what kind of a bookkeeping system is necessary, what stenographers shall write letters about, what kind of entries the clerks shall make, or what material shall be filed—that is another matter. The executive who is forced to make some sort of decision on these questions rarely reasons them out on the same principles that a mechanical engineer would follow to devise a machine to do a certain piece of work. In most cases, what he does is to endeavor to discover how someone else does it and then imitate the pattern, a point that is only too obvious. This is the reason for so much imitation in the office; it is much easier than original thinking. That is hard work, and most people try to evade it, but this practice cannot be kept up much longer.

Many young office managers and other ambitious young business men who aspire to the management of an office make extensive collections of forms and systems. When such a collection is made for purposes of comparison and with a desire for improvement (for instance, an inventor, to avoid inventing something already invented or superseded, would search the patent office records for ideas similar to his own), it is not only not a reprehensible practice but a highly meritorious one. But these collections are seldom so used. For the most part a form that strikes the fancy is copied almost verbatim. There are several types of application, invoice, and purchase forms to be found in hundreds of offices, varying only in the smallest degree from each other, which are yet literally full of defects that can at once be detected by anyone who gives the slightest study to the question of form design. Again, in office after office may be found order and other routines containing numerous false moves and involving much useless labor, and all so similar, that the conclusion is forced upon the observer that they must be

traditional methods. Books which give, or pretend to give, forms or systems which may be copied find a ready sale. Such imitation, let it be plainly understood, means not only no progress in office management, but actually retrogression.

Attention should be focused upon the *product* of office management, as this product has been defined.

Condensed Picture of a Typical Office Organization

Let us, for purposes of illustration, assume an established manufacturing business and endeavor to outline what the desired results would comprise. This can be little more than a sketchy picture, but enough will be given to show clearly what is meant and what kind of thinking is required.

First, it will be recognized that the company, if it is to manufacture a commodity, must purchase materials of various sorts. It would therefore be logical to assume that the purchasing agent should know what those materials are, their nature, their use, and the qualities they must possess. The next requirement is that he should have a list of suppliers, a set of catalogues, and other data that will assist him in making wise purchases, and this information should be classified and filed ready for use. The third requirement is that he must have some kind of purchase-order system. What are the essentials of such a system?

1. The system must make it possible to secure the material ordered, in accordance with the specifications, and requirements as to delivery.

2. It must record the fact that an order has been issued, and this information must be readily available at all times.

3. It must provide for a notification to the receiving clerk that an order has been issued, and instructions as to what he is to do with the material when and as it is received.

4. The bookkeeping department must be notified that an obligation in the name of the company has been incurred.

5. The stores clerk must be notified that an order has been issued, so that he can correct his records and thus avoid issuing a duplicate request to purchase for the same material.

The above are the essentials of a purchase-order system.

In addition, the purchasing agent may desire to keep some other records of a statistical nature, to assist him in making wise purchases, but it is not necessary to consider these at present.

In so far as these activities are performed in an effective and economical manner, that product is valuable; in so far as other things, not desired, are added or permitted to enter unobserved into the routine—and unless careful preplanning is done, these additions are easily made—the product is nonexistent, the work is of no more avail than that of the digger in the quicksand.

The Office Manager's Part in Defining Work

The question naturally arises here as to whether or not the office manager is supposed to be thoroughly conversant with the jobs of the managers of the production, sales, and accounting departments. The correct answer is that in a general way he should be familiar with the essential purposes, duties, and requirements of all departments of the business; in other words he should possess a broad, general knowledge of business. But most certainly he should be thoroughly familiar with the clerical requirements of all departments, or, if he is not, he should at once make it his special endeavor to become so.

If he realizes that he does not know and assumes that he should not be expected to know anything of production, sales, finance, or accounting, he should remember that by the same logic neither should the managers of these departments be expected to know anything of office work. This attitude may either involve an impasse or compel a measure of cooperation; and for the good of the business, cooperation is of course preferable. The office manager should at all times be ready to study the clerical requirements of any department of the business, and he will then be better qualified than anyone else to determine the best method of fulfilling them.

The general problem of office management, however, should not be regarded as one of such forbidding proportions as to induce awe in its survey—the office manager should not assume that it is a necessity for him to have an intimate and minute knowledge of every part of the business. He should rather specialize, so that he may understand his particular job better than any other person in the institution, and this is in no sense an insuperable or even particularly formidable task. If he thoroughly comprehends that the products of his department are as tangible and real as those of the factory and that these products must be desired results, he will know immediately what should be done

to secure such results, without imitating the work of some other office manager.

He will also find that his problem will be cleared of many complications if he will but remember as a fundamental principle that there are but three ultimate purposes of office work, as explained earlier in this chapter.

If the office manager, instead of gazing with dismay upon a heterogeneous mass of operations, such as typing, filing, checking, making entries, and so forth, will look beyond and through them all and fix his attention upon the result he desires to accomplish and will then classify it in one or more of the three fundamental types of office work described, each of which involves a different underlying principle, the problem becomes simple. Office work, when considered as an end in itself, leads to chaos and confusion; considered as a means to an end, the problem presents itself clearly and simply to view and is at once divested of the imaginary terrors that arise from regarding it as a mass of heterogeneous and uncoordinated operations.

It will now be clearly evident that office work is something not only far greater than a mere auxiliary or appendage for facilitating the conduct of modern business but is essentially a linking function, without which such conduct is actually inconceivable. It may without exaggeration be recognized as the principal coordinating function, in that it holds together and actually keeps the business machine in motion.

No longer can office work be logically regarded as "nonproductive" or "overhead," using these terms in the disparaging sense that indicates a heavy and more or less useless burden, for a function without which production cannot be carried on at all cannot with reason be regarded as "nonproductive."

The Present Trend

The years between 1900 and 1920 constituted the heyday of the so-called "systematizer," with his card and loose-leaf systems. The conception of business by this individual was somewhat distorted. He had a new toy for sale—the loose-leaf book and the card—which apparently offered bewildering possibilities as compared with the old, inflexible bound book. It could be used at all times, in all places, and for all purposes; it was, in

short, the long-sought-for panacea. For every business activity the seductive "systematizer" designed a little card system, which he applied to all companies alike. Some, still more enterprising, combined with their system work the sale of equipment and cards and loose leaves and offered to do the "systematizing" for nothing, provided their merchandise was bought. There were "systems" for this, that, and the other contingency, so many in fact that it was difficult to get any work done. In the storerooms of many offices throughout the country, we have seen hundreds of dollars worth of forms for these systems that were obsolete, because they were abandoned as soon as the spell of the brilliant system salesman wore off. During the latter part of this period, sanity managed to enter into office work and began eviction proceedings against the most obviously superfluous of the systems. Card and loose-leaf ledgers survived because they were in reality a distinct advance, but most of the intricate systems that originally accompanied them were abandoned and in their place remained only the legitimate uses of these new devices.

Office machinery and equipment have undergone a somewhat similar experience. At first such machinery was sold to replace human brains, and it was vociferously claimed for each machine that it was "foolproof." Those who took the statement too literally and placed "fools" in charge of the machines got their experience and education together, though at an excessive price.

During the past few years the trend of office management indicates that men of greater executive ability are being placed in charge of the office, and the level of intelligence and education required for the performance of the clerical work is rising from the grammar school to the high school, many clerical positions even now being filled by university graduates. The office boy no longer "attends to the files in his spare time."

The result of these changes has been such that it is not difficult to predict what the future holds forth.

Systems will be simplified and designed to accomplish their results in a direct, instead of an indirect, manner; superfluous work and details will be increasingly eliminated; short-cut methods will be put into operation, together with a better and more scientific selection of help, and scientific training and greater use of machinery. Everything that science and common sense can offer will be used to reduce the expense of the clerical work.

Simplification of Systems

In these last few years, a most decided change has taken place in office systems. The old executives were wont to maintain individual tickler systems and most elaborate card files in their desks. Modern executives are graduating from the clerical detail and devoting more attention to analysis and planning and to the direction of others, the kind of work that demands trained intellectual power.

The numerical filing system, with its elaborate and complicated cross indexes on cards, was not so long ago considered the *ne plus ultra* of modern filing. Today, one rarely finds this system, the simple alphabetical plan with a few improvements having largely displaced it.

Order systems with a host of carbon copies made at one writing, and traveling to all parts of the office, were once considered wonderful, and the more copies the more wonderful the system. This, too, has passed away, for office managers are now discovering that each extra copy adds uselessly to the work of the office, and as a result fewer and fewer copies are being made. The marvel of hectograph, spirit, and carbon duplication no longer thrills, for common sense is making its entrance into the problem of systematizing. Each copy must now demonstrate its reason for being.

The Elimination of Superfluous Work

For many years the aforesaid systematizers frightened unthinking managers by loudly proclaiming that good management required "guarding against dishonesty"; "having all the facts at your finger tips"; "verbal orders don't go"; "do it now!" and a host of other slogans to arouse dormant brains to the supposed need of purchasing their various systems. Magic words these, which seemed to thrill one with their apparent simple truth and to arouse in every office man an ambition to elaborate his work, render it more imposing, and—while he was about it—more mysterious.

Complicated and intricate checks were thus devised to prevent a dishonest clerk from committing forgery or otherwise defaulting. Honest clerks did the extra work required, but the dishon-

est ones always seemed able to circumvent the system, however elaborately constructed.

Systems were devised for recording every known fact that could, by any remote chance, be construed as having a bearing on the business. There were reports on every phase of the work, which were manifolded and delivered to a large number of executives, though whether or not they could or would use the information thus given them received no particular consideration.

Letters were written by department heads to section heads about matters that could be much more effectively discussed in person; clerks wrote "memorandums" to each other on the slightest provocation, for the commandment to "put it in writing" applied to even the most trivial things and was literally obeyed.

Executives, instead of logically planning their work attempted to do it just as it came—obeying the injunction to "do it now!"—with the result that with much effort they accomplished little.

A decided reaction against superfluous work has arisen in the office and will certainly continue. From this time onward each piece of work must "show cause," for owners are rapidly learning that superfluous clerical labor is a direct deduction from profits.

Elimination of Superfluous Details

Not only is the superfluous work being eliminated, but useful work is being examined, as it were, with a microscope, to discover whether or not it contains superfluous details. Short-cut methods are being used wherever possible.

The old-fashioned daybook entry, which was posted into the journal and from there posted into the ledger with elaborate detail, passed out years ago, as did also the elaborate ruling with red ink, of closed accounts. At that time, it was felt by many old-time bookkeepers, that the art of bookkeeping was dying. Today they would be thoroughly convinced that it was gone, for the journal also has to a large extent been eliminated by using, in its stead, a copy of the invoice or charge. The old entries were elaborate and complete; the new ones are shortened and abbreviated as much as possible.

A similar process of simplification is going on in all other branches of clerical work.

The Establishment of Standards

Office managers have been increasingly adopting the methods of science in their work. Instead of permitting it to be done according to the methods—or rather lack of methods—of the individual clerks, the one best way is being found by scientific methods and standardized. Plans of office arrangement are being devised with greater thought and care; equipment, machinery, operating and personnel methods are being standardized. In progressive companies, standards are becoming the rule rather than the exception.

Scientific selection of employees has made great strides, and it is still likely that its momentum will be increased in the future.

Thorough Training

The old method of securing a business training was to spend six months in a business "college," directly after leaving grammar school, get a smattering of bookkeeping, shorthand, and typewriting, and then go out and get a job—if you could. Most offices had openings for "experienced" clerks only, and many and devious were the devices for getting this "experience." Some went into small offices and worked for relatives or small business men, for nothing a week for a few months, and then proclaimed themselves experienced. The process then was to set a clerk down to a desk, give him a batch of letters or other papers, and tell him to go ahead on them. He made mistakes, of course, and was thoroughly disciplined for them if not discharged, and in this manner, by the old trial-and-error method—meaning that he was tried out and "fired" if he made too many errors—he accumulated his experience and acquired something that by a liberal stretching of the imagination might be called training, through a number of years.

But clerks are now actually being trained—some of the most progressive companies preferring the inexperienced applicant as unspoiled material which they can mold to their own requirements. Business schools have greatly improved the character of their work, the universities are training young executives in business administration, and many of the more progressive corporations are paying for continuation courses for their more ambitious clerks. Office managers are rapidly learning that a

thorough training of employees is a much shorter route to more and better work than the old method of learning by making mistakes.

A Greater Use of Machinery

There is a much greater use of office machinery than ever before, but no longer is it being sold on the old "foolproof" claim. Instead, the office-appliance manufacturers now conduct great service departments for the special purpose of developing and training operators in the correct use of their machines. The increasing use of machinery for repetitive tasks tends to eliminate the clerk of low intelligence usually assigned to such work, and this correspondingly raises the standard of intelligence among the remaining clerks.

Though, as elsewhere, it may seem to some that the limit of ingenuity has been reached in office machinery and appliances, there is little doubt but that as the necessity arises more and more machines will be invented, and those already in service today will be more effectively, economically, and thoroughly used.

A Contrary Tendency

Though the conditions above enumerated all tend to decrease the expense of clerical labor, there is, nevertheless, a contrary tendency in office work, which shows itself mainly in a continual increase in the size of the office, due to an increasingly extensive use of methods of analysis and preplanning in business.

Thus, the increasing use of statistics requires more and better clerks, for the statistics must be not merely gathered but correctly interpreted for the executives, and such interpretation work demands a high order of intelligence.

The growing use of sales analysis has a similar effect. The product is being studied and tested in comparison with competing products. Territories are being studied closely, and most elaborate methods devised for tracing down, examining, analyzing, and cataloguing every last possible purchaser. Sales methods are being time studied and perfected, and all this work, the success of which has been demonstrated, requires more and more clerks.

The preparation of cost and planning systems and the use of the budget are also increasing activities that require more clerical

labor. The statistics clearly show that despite the improvements tending to reduce the amount of clerical labor, the number and proportion of clerical workers increase at a prodigious rate.

What the Future Requires

Science in management has already, to an enormous extent, demonstrated its success. Spreading out into many departments of industry, it has clearly demonstrated its superiority over the old-time unsystematic management based largely on luck, chance, inspiration, or that nondescript, half presentiment, half guesswork, popularly known as "hunch."

Scientific management is no longer an untried theory; it is, instead, a practical reality. It is becoming increasingly evident that, if the clerical problem is to be solved, the methods of the future must be those of scientific management.

Capable executives must be selected for the position of office manager and given training in scientific methods, not a superficial education, but a thorough training in the principles and practice of scientific management, with a particular application of this science to the needs and conduct of the office.

An adequate salary must be paid to this new executive, a salary sufficient to attract the most capable. At present, in many organizations, the so-called "office manager" is the lowest priced executive in the concern, yet, as has been shown, he is charged with a vitally important responsibility, the management of a function without which business cannot long exist, and which, when badly managed, can waste, in superfluous help, poor service, and costly errors, a sum many times the salary paid him. The position must be made attractive to ambitious and capable young men and endowed with that dignity it so clearly merits.

Not too often is the office manager called in council with other executives when changes in policy or plans are discussed, even though some of these changes may require heavy increases in clerical labor. After the plans are completed, they are nevertheless turned over to him to carry out, though he has had nothing to say about them. The office manager is entitled to a place and voice in management councils, and if he is the right kind of executive, who knows what is due his position, he will demand and get it.

The term "office" must, itself, be broadened. In actual practice it no longer comprises the small group of clerks surrounding the accounting department, but all clerical workers; for clerks are in all departments, and scattered through the entire organization.

The title of "Office Manager" does not, in itself, indicate the responsibilities of the individual charged with the management and conduct of a class of workers who constitute more than 10 per cent of all persons gainfully occupied in the entire country. A better title, one that connotes the management of *all* clerks in *all* parts of the enterprise, is "Manager of Clerical Activities."

Questions for Discussion

1. With what is office management concerned?
2. In what way is office work concerned primarily with the records of the enterprise?
3. Why should an enterprise need records?
4. Can you think of any enterprise in your locality which does not need records? If so, explain.
5. Can you think of any activity, other than those of a business nature, which does not need records? If so, explain.
6. Would you say that office work is found only in business enterprises?
7. *a.* Is office work always done in an office? Explain your answer.

   b. What is the significance of your answer to the above question?
8. Why is the term "clerical work" sometimes preferable to the term "office work"?
9. What collateral tasks besides records are also included in office work?
10. Why are these tasks called "collateral tasks"?
11. *a.* Name as many different kinds of communication as you can recall.

    b. With respect to each kind, state why it is included in office work.
12. In connection with each of the various kinds of communication listed in your answer to Question 11, what record or records do you think might be made or needed before, during, and after the communication?

13. Would your answers to Questions 8 to 11 be different if you had substituted "clerical" for "office"?

14. Why should planning and scheduling be included in office work?

15. Statistical work often requires highly trained individuals called "statisticians." What justification is there for including statistical work in office work?

16. Explain "computing" and state why it is considered as office work.

17. Into what three simple, yet fundamental tasks may all office work be divided?

18. Can you think of any kind of office work that would not be included in the three tasks? If so, explain.

19. "The office is a linking activity." Explain.

20. *a.* Who may exercise the function of office management?
b. Where may he exercise it?
c. What may he be called instead of "office manager"?

21. Why may only a few individuals in an enterprise be expected to have a mastery of office management?

22. When is office work "productive," and when is it "non-productive"?

23. Why is there so much imitation of others by the management of many offices?

24. What is the objection to the collection of forms and systems by a student of office management? What may be the advantages?

25. What are the three requirements of a purchasing agent?

26. What are the five essentials of a purchase-order system?

27. With respect to each essential of a purchase-order system, explain why it is an essential, and what the purpose of it is.

28. To what extent should an office manager be conversant with the jobs of the managers of production, sales, and advertising departments?

29. Should the office manager specialize? Why or why not?

30. What is the difference between considering office work as an end in itself and considering it as a means to an end?

31. What is the difference between "systematizing" and "office management"?

32. Are systems necessary to the proper performance of office work? Why or why not?

33. Trace some of the developments in office work from 1900 to the present.

34. How would you recognize "superfluous work" when you see it? What is the objection to it?

35. "Office managers are increasingly adopting the methods of science in their work." Explain this statement.

36. What are the advantages of trained employees over untrained ones?

37. What effect is the increasing use of office machinery having on the caliber of office clerks? Why?

38. If scientific office management tends to decrease the cost of office work, why are offices increasing in size?

Problem

In a New York wholesale house there is a large filing department. Files are kept for 10 years before being destroyed. The equipment used is to a large extent obsolete. This office also prepares a large quantity of statistics—much more than is used. The stenographers average 10 letters a day each.

Would you say that this clerical force was producing values? If not, what is necessary to be done to make it productive?

II

THE MODERN CONCEPTION OF OFFICE MANAGMENT

In its formative years when the office was developing from one bookkeeper, it was natural that the chief endeavor in this development should take the form of devising improved ways and methods of doing things. The preparation of a form, for example, was in reality nothing more than the devising of a standard way of recording information. A form, properly designed, enabled the office manager of that day to get the desired information recorded exactly in the shape he wanted it and without the use of personal instructions. Such a form might be regarded as analogous to the "jig" used in factories, which enabled a "machine hand" to perform work which otherwise could have been done only by a skilled mechanic. A system, properly devised, enabled the office manager to provide against contingencies which would almost inevitably happen were the work not performed in a systematic manner. This period of development has now passed its maximum and the tendency in office management is changing.

The remarkably rapid growth of the proportion of clerical labor to the so-called direct and productive labor has forced new conceptions of management upon office executives. The necessity of clerical work to modern industry is now an accepted and unquestioned fact and no longer a subject for doubt or dispute. But there is now a distinct and growing tendency to question the cost of clerical work in proportion to its value. Instead of directing his attention wholly toward devising new systems and methods for performing clerical operations, the modern office manager is now carefully balancing the necessity of specified clerical tasks against the value that accrues to the company from their performance. The practical elimination of filing from the clerical labor of the great mail-order houses is perhaps the classical, and certainly the greatest, manifestation of this tendency.

Formerly the average office manager would have advocated reports covering every conceivable activity of the organization.

Many executives made a fetish of demanding complete and exhaustive reports, caring little and probably thinking little of the clerical cost involved. Today the office manager is questioning the value of reports on some features. One institution, for example, eliminated 65 of 100 reports that were being made for various executives, thereby effecting a clerical saving of nearly 20 per cent; that is to say, nearly 20 per cent of all the clerks in that large office were working on these superfluous reports. But they were not arbitrarily eliminated. A careful analysis of the use and value of each report was made, in consequence of which many startling facts came to light. It was found that many of these reports were duplications, others were not used at all, and many which were used were not worth the cost of making.

A similar condition may be found in the practice of filing. A filing system is unquestionably an effective tool for the systematic executive, and its use in office practice is indispensable, but a casual examination of almost any filing drawer in any office will show that hundreds of letters and papers which have no value whatever are being preserved. As in the matter of furnishing reports, some firms evidently pride themselves on being able to show and locate every communication they have ever received, utterly ignoring the fundamental fact that the only reason for filing a letter is the assumption that it will be wanted for reference at a future time. The mail-order houses, when confronted with the problem of the apparent necessity of excessive space requirement, solved it by actually testing out what would happen if they abandoned the idea of filing altogether and sent the letters back to the customers. They sent them back, and—nothing happened. Similar illustrations might be multiplied indefinitely; many more will be given throughout the volume.

The modern conception of office management may be thus summarized by those who possess it:

> There are standard ways for doing almost every clerical task, and there are standard systems designed to provide against most legitimate contingencies; these we must adopt but, before assigning any clerical task or preparing any system, we must also decide: (1) What is the value of the work to be done? (2) What is its probable cost? (3) Is it worth what it will cost?

In a word, then, the aim of the modern conception of office management is *simplification*.

Forces That Make for Scientific Office Management

The present status of office management in general is much higher than it was 15 or 20 years ago, but there are still many office managers who make no pretense to scientific management of clerical activities and to whom it is not even a definite conception.

There are many signs on the business horizon, however, of an approaching change in this state of affairs, a change that is unavoidable because of its sheer economic necessity. It is easily conceivable that the clerical burden may grow to a point where the expense of the conduct of business largely destroys its profitable character, and then the sheer economic necessity of change, previously referred to, becomes apparent. But long before this—in fact during the coming decade—there is certain to be a general recognition of this startling situation. Economic conditions will force it, and the ensuing demand for high-grade office managers will then far exceed the supply.

Results of Lack of Centralized Control in the Office

The chief difficulty at present is that the clerical activities have not been placed under central control in the office and that there has been, on the whole, little perception of the need of such control, the minds of many business executives being still obsessed with antiquated conceptions of clerical functions.

Thus, in many concerns, the works manager considers it his prerogative to have control of the works clerks, and the sales manager regards the clerks in his department from the same point of view; the accounting department in the same cases assumes the control of all other miscellaneous clerks. The clerical activities, being thus scattered in several small and more or less unconnected groups, tend to bring into existence one or more—and sometimes all—of the following conditions:

1. Lack of cooperation and coordination of effort. There is little harmony between the various groups and much useless duplication of work. This condition is apparent after even a cursory examination.

2. Much idle time—a condition impossible to correct, because of this grouping, and often impossible to detect because it generally occurs in small periods of time, distributed throughout the working day.

3. Much wasted effort because no one has studied the operations for duplication and useless motions.

These conditions are to be expected where the office consists of small groups under indifferent management.

Common Attitude of Many Executives toward Office Functions

The common policy of dividing the office into small groups invariably means expensive management, which in nearly every case is also of a low grade. The works superintendent is not an office man, and as a rule he bears the traditional contempt of his kind for office workers, regarding them as "nonproducers." He usually considers all their work extremely simple and therefore worthy of little attention; but with complete lack of logic, he is constantly worried about the inefficiency of the clerks in his department. The sales manager is not an office man either, though usually of a different mental type from the works manager. His sole interest is in making sales, and for this purpose he demands the highest grade of clerks and usually gets them, regardless of expense, though he rarely sees to it that they are profitably employed. There is usually much clerical time wasted in the sales office, while the sales manager is occupied with the original mental work which naturally demands his chief attention. The same remarks apply in general to other department chiefs. Their principal task being something else than the management of clerks and clerical functions, there is little attention paid to that department of business, as it is simply not recognized as such.

The Present and Future Status of the Office Manager

There is a brilliant future for those office managers who have arrived at the recognition of the office function as an essential feature of all enterprises and of the material importance of the work of office management. When these men set themselves to discover the range of possibilities of scientific office management and make it their profession, they will substantially advance the interest of their company, effect large savings, and thereby greatly add to the profits of the business, while at the same time forcing the more or less reluctant admission of the vital importance of their work from other executives.

There will be keen competition for the services of such executives in the near future, as business men wake up to the need of giving the office the attention it deserves and will so well repay.

Solving an Ancient Difficulty

The production manager of a concern would not for a moment think of allowing the sales manager to manage his factory, for he feels that the latter does not and could not possibly understand the handling of workingmen, a lack of understanding which he is certain would lead to trouble. The sales manager feels exactly the same way about permitting either the production manager or the office manager to handle salesmen. Yet, despite these obvious proofs of the need of specialization, each one of them believes, or at least assumes to believe, that almost anyone can handle clerks and clerical work.

Nevertheless, there are many cases where it is necessary for the clerks to work directly in the works office, the sales office, or the accounting department; in the last, especially, the clerks are never separated from the books. In cases of this kind, the problem of supervision becomes complicated. Naturally enough, the head of the department involved feels that he should have full control of the clerks in his department, and just as naturally he would object to dividing this control with the office manager. Frederick W. Taylor solved this difficulty by instituting the "functional foreman," so called because he is made responsible for the correct performance of a certain function. In the case of the office manager, this would mean that he would have authority over and responsibility for the clerical function throughout the company, in all departments. The local department manager's control would extend to the determination of the work to be done by the clerks, but the office manager would decide who was to do the work, how it was to be done, and how much should be expected to be done. The office manager's position, then, is similar to that of a functional foreman.

Advantages of Centralized Office Control

Endowing the office manager with authority over all clerical activities immediately attaches a certain dignity to his position and prevents small departmental jealousies which otherwise are bound to arise. Inasmuch as he decides who is to do the work,

he also is empowered to transfer clerks from one department to another and is thus enabled to anticipate idle periods in one department and reduce the load in peak periods in another one. This again enables him to absorb productively much idle time which otherwise is paid for by the company, but for which it gets no return. There will be many positions, of course, where special training and experience are both required, and in such cases the office manager will so arrange the work as to leave these special workers in the one position. But this condition by no means occurs so frequently as is generally supposed. Usually the positions which are assumed to require much experience are those where the clerk is supposed to anticipate the wants and desires of an executive and to understand his personal peculiarities. This may or may not be an important matter, depending entirely upon the circumstances of the case, but it is undeniable that many minor executives develop personal idiosyncrasies and make demands upon clerks which are not particularly reasonable. In such cases centralized control will save much idle time and compel these minor executives to become more productive, because through it the peculiar characteristics of such persons will be disclosed and it will become necessary for them to do their own work properly. The control of the department or section head over what work is to be done should, however, remain unquestioned. If he is to be held responsible for results, he should have authority to decide what work is necessary and what should be given precedence over other work in his department.

Properly organized under central control, the majority of clerks in the ordinary business office will render better and more nearly adequate service. There should be one central stenographic section which will render stenographic and typewriting service to the entire office, instead of small groups of uncontrolled stenographers throughout the office who work part of their time only on letters, and part on miscellaneous clerical work, and as is often the case, at other times sit in absolute idleness. When this work is centralized each stenographer will produce much more than would otherwise be the case, and as a result a smaller force will be required. This, however, does not mean that there should not be a certain number of private secretaries for the most important executives, for the valuable time of these

men can be saved by the many things a secretary can do for them. Section heads do not need secretaries and should not have them. It is not uncommon to find minor executives with private secretaries who draw almost as much salary as their principals.

Again, a central filing section can be much better managed than small groups of files scattered throughout the office. The material will be kept in better order, the work more economically done, and in general much better service will be given. This, of course, does not refer to the private files of the chief executive, which may contain much material that should not be in the general file.

A central computing department will often be found to be a distinct advantage. Work on adding machines, comptometers, computing machines, and so forth, requires trained operators, and the difference in output between them and persons who work at the machines only sporadically, or for a short period each day, is about four to one. If there is any computing work that must be done in the other departments, it can be handled in the same manner as dictation—by sending an operative from the computing section to such departments.

Stock keeping at present is usually centralized even in offices that have little centralized control otherwise.

Mimeographing, multigraphing, and other duplication work are also much better handled by a central department than in isolated sections.

When these various activities are centralized and in operation, there will still be a certain number of departmental clerks remaining, but in their case the office manager will still have control as to who shall perform the work, and how it shall be done.

By his standardization of work the office manager will also develop better methods of performing each clerical operation; he should, therefore, prescribe the methods to be used and have the workers trained in their performance. This will result in an equally high standard of work throughout the office, a condition not usually found in offices where this is not the practice.

Finally, the office manager through his control or planning room will actually control the production of the entire clerical staff. Standards will be set, tasks will be assigned and controlled with the same precision and definiteness as in the scientifically managed factory.

With the office thus organized and operated, its real character as a vital function of business at once becomes evident as its capacity for connecting production and sales is immensely increased. Such an office can, in addition, be economically operated, but it requires a high-grade executive as manager.

What Size Office Should Have a Manager?

The same general principles apply to small offices of all kinds, though, of course, the control machinery cannot be so elaborate.

Probably the minimum size of office which can afford to have a manager whose sole duty it is to control clerical functions is one containing 50 clerks. Offices with a smaller force than this can use the same principles, but the control should be delegated to an executive who has also some other function to perform, preferably one whose duties require his constant presence in the office.

The Principles of Scientific Office Management

The fundamentals of office management do not differ from the fundamentals of the management of any other cooperative human activity. The material dealt with may be different in certain external features, but the basic principles which permeate all management are the same, regardless of the nature of the activity. The violation of these principles reduces the effectiveness of business as certainly as the violation of a physical law brings its inevitable consequences.

Since few of these principles are ever thought of by the rule-of-thumb manager, the world is literally full of the most glaring examples of their violation, resulting in an interminable waste of time and energy and a huge amount of property loss and human suffering, most of which is avoidable and hence unnecessary.

It follows, therefore, that a thorough knowledge of the science of management is far more important to the office manager than a mere knowledge of the art of management without an understanding of the scientific foundation upon which that art has been constructed.

There was a time when the ideal office manager was considered one who had a thorough experience in bookkeeping, and whether or not he knew anything of actual management was regarded as unimportant, for, "after all, he only has to manage a few typists

and file clerks." As well might it be said that a factory superintendent needed to know nothing about management, because he had only to deal with laborers.

One may question the use of the word "science" in connection with the word "management," which is commonly called an art. Science is coordinated and codified knowledge, gained by systematic observation, experiment, and reasoning. In this sense there is a science of management sharply to be distinguished from the art of which it is the basis, and from sciences which are auxiliary to it, such as physics, mechanics, and psychology.[1]

I. Stating the Problem

The first principle of office management is comprised in the possession of a definite knowledge of what work is to be undertaken and its purpose. Unless we know what to do, and why we do it, we cannot know how to do it. The office manager, who asks himself, "What is my work?" and "What is its purpose?" and has worked out a clear, definite, complete, and correct answer to those questions, has laid the corner stone of the foundation upon which the whole structure is to be erected.

Simple and obvious as this is, it is—perhaps for that very reason—usually neglected. Most men undertake work with little more than a superficial assumption that they understand "in a general way" what they propose to do and why they do it. They assume that the object and purpose of the work are matters that call for no particular study or thought, yet it is obvious that an adequate knowledge of this basic principle is the logical starting point of every proposed activity. No scientific man ever sets out to solve a problem of any sort, without first carefully defining that problem and its purpose, and he may, and usually does, expend long periods of time and much thought in correctly formulating it, knowing well that, unless this work is thoroughly and accurately done, his future efforts may be completely wasted. The same reasoning applies equally to management. In both cases the truism of the old mathematicians holds good, that "a problem correctly stated is already half solved."

[1] See Sheldon, *Philosophy of Management*, p. 33; and *Bulletin of Taylor Society*, Vol. VIII, No. 6, p. 210.

II. Analyzing the Problem

This second principle consists in the analysis of the problem. That all problems are composed of various parts or elements is, of course, at once perceived, and it is equally obvious that each of these elements has a bearing on the subject, and this relation must be carefully studied if the analysis of the whole is to be successful.

Analysis, though it may be accompanied by actual, material tests, is purely a mental process and requires an orderly, persistent, and logical use of the mind that seems difficult only because most people have not developed their faculty for analysis. It is an imperative necessity for all scientific work and is so closely connected therewith that the word "analysis" itself immediately suggests the other term—"scientific."

Literally, "analysis" means "the separation of anything into its constituent parts or elements"; it also means "an examination of anything to distinguish its component parts, either separately or in their relation to the whole." To analyze a problem, then, means to find, by thought, its elements or component parts. In addition to this necessary breaking down of the subject, each factor must be given its correct relative importance—its position in the chain of reasoning. Is it a major or a minor factor? Is it a factor that stands alone; does it include other factors; or is it merely a subdivision of another factor itself?

There is no end to the analytic process. One can keep on subdividing a subject almost indefinitely if he applies sufficient thought to it. The adequate solution of the problem implies also a knowledge of when to stop, and this is the reason for the first principle. We must define exactly what we want to do, neither more nor less. Such definition marks the limitations of the problem.

When the purpose has been defined, the proposed task correctly formulated and its parts analyzed, the next fundamental principle is the necessity of searching for the facts related to the problem.

III. Finding the Facts of the Case

If it is desired to improve the existing method of performing a task, the necessity of collecting all the facts concerning it is

at once evident. If, for instance, the existing method consumes too much time, we must discover and collect all the facts relating to this condition. The tools, the equipment, the material, the operators, the motions they use, the amount of effort applied—every condition under which the task is performed is a fact that has a bearing on the object we desire to accomplish; in this instance the saving of time on an operation. None must be overlooked; all must be studied. Whatever desirable elements are found in the operation must be retained and, if possible, improved. Those which are undesirable must be eliminated. Now it is evident that this cannot be done unless we are in possession of all the facts bearing on the problem.

We can find our facts in three ways: by information from others—which includes books, records, and other principal and original sources—by our own inferences, and by actual test. If we find our facts in the first manner, we must make certain that the information is reliable, for misleading information is everywhere abundant and easily procurable. Besides, it requires some experience in thinking to formulate a question so as to elicit a correct reply.

Our own inferences as to what are and what are not facts should also be carefully scrutinized, for they may easily be ill-founded assumptions and in many cases especially subject to error. To infer, without investigation, is a most prolific source of difficulty.

The third method, that of actual test, is by all odds the most conclusive and certain. It is, in fact, the method par excellence of experimental science. There is in existence a vast body of facts, proved and tested beyond doubt by experimental science, and these facts are at the disposal of all who care to seek for them. They cover practically every range of human activity in the material world. It is from this vast repository of facts that all modern industrial processes have been evolved. Science has been applied to production in thousands of different ways, and though there are not so many years of experience with it in industrial management, it still has been applied to that subject in many directions.

The collection of facts regarding any problem having been made, the next step is to classify and arrange them in relation to each other and also to related facts. All this is an analytical

problem, and such work requires the same thoughtful, orderly use of the mind as does the analysis of the problem itself.

The three basic principles may be regarded as deliberative in character, the preparatory mental work necessary for the solution of the problem in hand.

IV. Finding the Right Method

This may be stated as the devising of the one best method of performing the particular task which we have defined and analyzed and regarding which we have collected and classified the necessary facts. We know (1) what we have set out to do; what its purpose is, (2) the nature and character of the elements composing our problem, and (3) the facts bearing upon and related to it.

Into the problem of devising a method of any sort there are at least three elemental conditions which invariably enter. They are time, space, and energy, and it is impossible to conceive of any problem, business or otherwise, that does not include them. They are, so to speak, the universal environment in which all activities must function, and all improvement, in fact every phase of the progress of mankind to higher levels, has been and must always be manifested in a conservation of one or other of these elemental conditions, and often of all three. In all improved methods of performing work we can discern either a saving of time, an economy of space, or a greater development and conservation of energy. This may also be manifested by the utilization of one of these factors in a manner hitherto unknown. It is this fact that indeed marks all the progress of humanity.

To the three elemental conditions mentioned—time, space, and energy—may, in most cases, be added a fourth—the substance acted upon—the material.

In devising the one best method of performing any task, all these conditions must be given due consideration. Sometimes one and sometimes another of them will predominate in importance, but none should be overlooked.

Stated in condensed form, the devising of the one best method in relation to these conditions may be defined as the continuous and progressive elimination of waste in each.

V. Finding the Right Person

The fifth fundamental principle appears in logical succession, for these basic principles follow an orderly sequence, while at the same time interpenetrating each other. The person best fitted to operate the one best method must be found, for it would be only too evidently a waste of all the scientific effort already expended to commit the result to a person temperamentally, physically, mentally, or otherwise incapable of utilizing it to the highest degree possible.

The study of human aptitudes, the selection of the human element best fitted to perform any particular task, is therefore an essential principle of the science of management, which, from its very nature, is not and cannot wholly be confined to inanimate objects.

It must be recognized by management that certain personal qualities are essential for the performance of the best work on any particular task, and in all persons certain qualities and aptitudes predominate, so if the best results are to be obtained, these qualities must be sought for and fitted to the task in hand.

VI. Training the Right Person

Our next principle again obviously follows in logical succession. The person who has been scientifically selected as the best fitted for the work in hand must be carefully instructed in the method of performing it. This involves the training and teaching of the workers in the particular tasks assigned them, which is readily seen to be an indispensable part of the science of management. It must not be assumed (though it usually is) that simply because we have found the person best qualified for the job, he is immediately endowed with the ability to perform it in the manner which we desire. A period of teaching and training is invariably necessary, for the discovery of the person best fitted does not involve the assumption that he is already in possession of the experience needed in that particular work. This would assume, in fact, that he has already devised the one best method and actually worked on it in practice, an assumption which is, of course, absurd.

The reader who has thus far carefully considered the principles here enunciated will perceive that while they follow each

other in a logical order, they are also interdependent and possess many elements in common. The next principle is in itself a striking example of this fact. When the purpose has been defined, and it is known what work there is to do, and all has been set in order for doing it, we find that the original decision regarding what to do is not a definite act that terminates with the discovery, but an unending process. It becomes necessary continuously to determine and decide what work is to be done, and this activity may be defined as planning, which takes its place as the next principle.

VII. Planning

We usually think of planning as confined to the determination of material production as embodied in some particular article of commerce. That there must be much definite planning for the production of such a complex object as an automobile is, of course, evident, and it is comparatively easy also to extend the idea of planning to other functions of the establishment. But the idea of the application of planning to the daily clerical output of the office is not quite so easy to grasp.

It is apparent that in all work some mental process resembling planning always takes place, for it is impossible to do work without some sort of decision as to how to do it, and this may be called planning—of a sort. But the essence of planning, as a principle in the science of management, is that the work is done thoroughly and accurately, and this means much more than a loose and hasty decision regarding it.

The duties of the business office are so numerous and diversified that at first thought it would seem that it is utterly impossible to get things done without scientific planning. It is reasonable to assume that no single individual could ever keep in mind the hundreds of different tasks that must be performed, unless he had some mechanism to assist him, and this is actually the fact. Even the most unscientifically managed offices have a mechanism that serves more or less effectively as a planning factor, though it is rarely recognized as such. This mechanism is the routine.

Division of labor is carried out to a great extent in the performance of clerical work, and this division makes it necessary for most of the work to travel through regular channels. When one operation is finished on a certain piece of work, it is passed

on to the next clerk, who performs another operation on it and passes it to the next, and so on. Work on an order routine, for example, often passes through 15 or 20 or, in some cases, 50 steps, before it is completed. Therefore, when work is once started on a journey of this kind, the office manager can—though it is not good practice to do so—practically forget it until it reaches its final destination. Were it not for the routine, which is a well-established feature in all office work, the average unscientifically managed office would present an appearance of chaos most of the time.

Though the routine thus acts as a planning mechanism, it is not sufficient, especially for a large office where there is much work to be done. The planning of work accurately and scientifically is an essential principle of the science of management.

VIII. Getting the Work Done

The final principle may be summed up in the word cooperation, and here again we are dealing with the human factor, as in the task of finding the person best fitted for certain work and teaching him to perform it. Without the cooperation of other human beings, modern industry is unthinkable, and the fullest, freest, and most intelligent cooperation of others is a necessity if the highest effectiveness is to be obtained. This holds good in all management and is in fact a universal principle which determines the measure of success of all joint human activities. Naturally it must function in the office, exactly as elsewhere.

Though cooperation as a principle is self-evident, the methods by which it is secured in fullest measure are not so evident. An organization has been concisely defined as "a collection of persons working together for a common end." Now it is easily possible to gather collections of persons; it is not difficult to persuade or even force them to work together; but the working for a "common end" is something that is not amenable to compulsion, it is wholly dependent upon the will of the "collection of persons," and until this will is freely, fully, and intelligently given by all, to the accomplishment of this common end, true cooperation has not been achieved.

To recognize that a manager possesses and exercises the ability to win cooperation is perhaps the highest tribute that can be paid him, for in a certain sense it is the culmination of the success-

ful application of all the scientific principles preceding it. The manager who has developed this faculty to a high degree is correspondingly rewarded and, if his work is studied, it will be found that he has followed with fair accuracy the principles here outlined.

We may observe here, as a slight digression, that in the above we have said nothing concerning what is called "good treatment" or "fair treatment" of employees. It is in fact superfluous. The scientific method of handling both human beings and their work is the best method. That this method includes fair and humane treatment to all concerned is amply set forth in the preceding paragraph.

Questions for Discussion

1. Would you say that the use of printed forms in office work is a result of the exercise of the office-management function by someone? Explain.

2. "There is a distinct and growing tendency to question the cost of clerical work in proportion to its value." Why? Illustrate your answer with specific instances.

3. Why should mail-order houses wish to eliminate filing the correspondence of their customers?

4. Do you believe that an enterprise should keep every letter and paper that comes into its possession? and a copy of every letter that goes out? Why or why not?

5. *a.* What criterion do you consider would be a sensible one to use in determining whether any specific letter should be filed or destroyed?

b. Who do you think should determine that fact? Why?

6. *a.* What advantages are gained by eliminating a number of reports?

b. How would you know which reports to eliminate?

7. What is the outstanding feature of the modern conception of office management?

8. What is the difference, if any, between elimination and simplification?

9. What is meant by centralized control of clerical activities?

10. What is the difference, if any, between centralization of location and centralization of control?

11. What are the advantages of centralized control by the office manager?

12. What conditions are to be expected where the office consists of small groups under indifferent management?

13. Comment on the attitude of many executives toward office functions. How would you explain this attitude?

14. Why are there opportunities for a competent office manager?

15. "The office manager's position is similar to that of a functional foreman." How?

16. State the principles of scientific office management.

17. Which of these eight principles do you think is the most important? Why?

18. Why is it necessary to precede the consideration of all management problems with a definition of the object and purpose of the work?

19. Why is it important to "state the problem"?

20. How far should the analysis of a problem be carried?

21. Generally speaking, what "facts" would you look for in carrying out the third principle of scientific office management?

22. In what three ways can you find the facts? Evaluate each of the three ways.

23. After you have collected the facts, what should you do with them?

24. What four elemental conditions enter into the devising of the one best method?

25. What relation does the elimination of waste bear to the four elements stated in your answer to Question 24?

26. Why is it important to "find the right person"?

27. The sixth principle of scientific office management is "training the right person." If a person were the right one, wouldn't he be already trained? Why or why not?

28. Why is planning necessary? Or isn't it?

29. If planning is important, why is it not the first principle of scientific office management instead of the seventh?

30. Why is "cooperation" a synonym for the eighth principle of scientific office management?

PROBLEM I

The general manager of a department store called in one of his promising young men and said, "Jim, we're thinking about using

modern methods in our accounts-receivable department and I'm putting it up to you to find out what should be done."

Jim at once proceeded to visit all the other department stores in town and then got permission to visit a number of other stores in neighboring cities. As a result of his peregrinations he presented a report to his superior, recommending that Triumph bookkeeping machines be used.

Assuming that he picked the best machine, did Jim attack this question properly?

Problem II

Henry Wright, now chairman of the board of the Wright Machine Tool Company, is of the old school. When he first started the company, about fifty years ago, there were only a few workmen and no clerks. As the company grew, Wright had to hire a bookkeeper and later a stenographer. As the years passed, the office force grew more rapidly than what he called "the productive workers."

Until the pay roll reached 500, Henry prided himself on knowing each employee's first name, and he knew the family history of many of them.

His son Frank, who is now president of the company, wishes to put in several "new-fangled" ideas, such as a cost department, statistics, financial reports, planning department, and the like and, as a matter of fact, has put in many of them already. He calls this keeping the office modern. The father condemns it all as nonsense and says that for years in the beginning he "kept all his records in his head" and made more money then than now. He thinks most of the records now kept are worthless.

Since the company desires to pay dividends, would it not be best to compromise and get rid of about half of the present clerks, by throwing out all except such records as are essential for the business?

If you agree, how would you determine which records were to be retained?

Problem III

The Kingman Manufacturing Company was founded in 1880 by the brothers Kingman, both now dead. It was originally a jobbing machine shop, but the sons of the original founders saw

an opportunity to enlarge the business by manufacturing a miscellaneous line of office devices and machines. They sold and for a time made large profits, but the quality of the goods fell below the advertising claims, with the result that business dropped off greatly and they were compelled to get new lines and seek new customers. Their employees are much dissatisfied with the prospects of promotion, for the most desirable positions are filled by relatives and, in the opinion of the staff, very poorly, in most cases. Their methods are archaic, and the output per employee is low, while the rate of turnover is about 150 per cent. Every year they bring out new articles, with the invariable experience that they are oversold or have a large inventory at the end of the year. A reorganization of the company is imminent.

What fundamental principles of management are violated by this company? What would you suggest they should do?

III

ORGANIZATION, ADMINISTRATION, MANAGEMENT, AND CONTROL

The difference between "administration" and "management" is not always clear to the student. Nor is the situation helped by the fact that each term is sometimes used to indicate a function and at other times to refer to the individual or group of individuals exercising that function.

To acquire the habit of thinking "functionally" is a real accomplishment. Such a habit simplifies many of the difficulties inherent in the analysis of management problems. Functional thinking makes it possible to separate the function itself from the individuals exercising the function or affected by its exercise. One or more functions are always involved in any situation, and the responsibility to exercise that function also exists. Unfortunately, the authority to exercise a particular function is not always definitely assigned to a certain individual, and for this reason it may not have been exercised. Or, lacking authority, some individual who might have assumed the responsibility did not do so, perhaps from discretion or from lack of courage. As a result, the function was not exercised, although it was present.

Administration

Consider "administration" for example. In management practice, "administration" has two significant meanings. One is the function of determining the major policies upon which the enterprise is to be conducted; the other is the individual or the group of individuals who exercise the function of administration. Except in very large concerns, the policy-making function is usually the responsibility of comparatively few individuals in the company. In a corporation, the board of directors lays down the major policies; in a partnership, the partners themselves establish the policies, unless they have agreed otherwise among themselves. In an individual proprietorship the proprietor determines the policies of his enterprise.

In each of these instances, the function of administration is the same—to determine the policies upon which the enterprise is to be conducted. New conditions may require new policies or a change in old ones; but the policy-making function is still present, and that function is the same in every concern and in every undertaking of any kind, business or otherwise. Someone has to lay down the policies which guide the conduct of the business. The policy-making function is the function of administration, and the individuals who exercise the administrative function are frequently referred to as "the administration."

Note, however, that although the policy-making function is present in every enterprise, the individual or individuals responsible for exercising that function vary with the enterprise. In the ABC Corporation, the directors happen to be Mr. Allen, Mr. Brown, and Mr. Carr. In the PQR Corporation, the directors are Mr. Peterson, Mr. Quincy, and Mr. Rowse—different individuals, but with the same function.

The ability to recognize a function wherever it is found is extremely helpful, since once a function is recognized, the responsibility for its exercise can be assigned to a particular individual or group of individuals. Furthermore, functional thinking makes it possible to combine like functions under a unified direction and control to assure uniformity of performance.

Management

Consider "management," as a second example. In management practice, "management" also has two significant meanings. One is the function itself, the other the individual or individuals responsible for exercising that function. The function of management is to carry out the policies laid down by the administrative group. The management function includes:

1. Determining the immediate results to be accomplished.
2. Planning how those results are to be accomplished.
3. Building the organization to secure those results.
4. Directing the organization to secure those results.
5. Controlling the organization, the plans, and the results.

The individuals who exercise the management function are the officers of the corporation, the members of the partnership, and the individual proprietor. These individuals, collectively in the cases of the corporation and the partnership, are also often

referred to as "the management." Let it be noted, however, that "the management" may delegate part of its function of management to others. Thus it is that department heads exercise the management function, each within his own department; division heads exercise the management function, each within his own division; and section heads likewise. Wherever the management function is present (and that should mean everywhere in the business), there is or should be someone responsible for exercising that function or a specific part of it.

The significance of the preceding statement is at once obvious when contemplating the function of office management, that function being the responsibility for the organization, direction, and control of office work, wherever found. The parallel to other coordinate functions is clear: the sales manager is responsible for the organization, direction, and control of sales everywhere; the purchasing agent is responsible for the organization, direction, and control of purchasing everywhere throughout the company; the credit manager, for the organization, direction, and control of credits and collections; and the traffic manager for the organization, direction, and control of traffic, wherever traffic is involved.

Organization

The word "organization" is also used in two ways. "Organization" may refer to the function of organizing, or it may refer to the structure of individuals and facilities by means of which the manager has his plans carried out. Curiously enough, we may say that an organization results from the exercise of the function of organizing. Whether the resulting organization is effective depends upon two factors: first, upon the care with which the organization was set up; and second, upon the wise direction and control of the organization by a competent executive.

A competent executive may be able to secure good results with a poor organization; a good organization may produce results for a poor executive; but the combination of a good organization and a good executive is "unbeatable," other things being equal.

What is good organization?

Good organization exists when each member of the group, already selected for his competency, is given a definite assignment and a stated time for carrying it out. The assignment is within

his ability to perform. He understands what he is to do, how he is to do it, and when. He is provided with the necessary facilities for accomplishing his appointed task, including proper materials, suitable equipment, competent assistance, and adequate supervision. If to this statement of good organization were added "under good working conditions," we should have an ideal setup for accomplishing any desired results.

Organization is concerned with "who is to do what is to be done." Three questions frequently asked are, "What shall be done?" "How shall it be done?" and "Who shall do it?" The first is a question of policy; policies determine what shall be done under given circumstances. The second question is one of method; all "how" questions are questions of method. But the third question, "Who shall do it?" is a question of organization. Whenever the question is raised as to who should do this, or who should do that, or what department should take care of a particular problem, the answer is always one of organization. What is the setup? To whom has this responsibility been assigned? Often the problem arises because it has not been assigned to anyone; the responsibility of making assignments is placed squarely upon management.

Five Important Points

The very first rule of organization is that definite and clean-cut responsibilities shall be assigned to each executive and to each employee. In no other way can responsibility for results be fixed. In no other way can "buck-passing" be effectively forestalled. In no other way will each individual in the organization know what is expected of him. Instead of wondering whether or not he is responsible for certain things, he knows. Surely that is the least that the manager can do; how can he expect a person to do a certain thing if that person doesn't know it is his responsibility?

Along with the assignment of responsibility is the delegation of authority. Authority is the power to command or to act. If a responsibility requires authority, whatever authority is required should be delegated by the executive making the assignment. If authority is not delegated, one of two things may happen: either the individual will do nothing, because he has not the authority; or he will assume the authority and go ahead

"on his own." The often resulting unpleasantness in either case could easily have been avoided by observing this second rule of organization: responsibility shall always be accompanied by corresponding authority.

A rather interesting point in connection with authority and responsibility is that authority flows downward, while responsibility always moves upward. An individual derives his authority from someone above him, to whom he is responsible for the proper performance of the task assigned to him.

In any case, lack of clearly defined lines of authority and responsibility is one of the most common difficulties in office organization; the authority of certain section and department heads is not clearly understood by the employees, and sometimes not by the heads themselves. As a result, there is misunderstanding and strife, for where the lines of authority are allowed to remain indefinite and questionable, confusion is practically certain to ensue.

Another important point is that no one individual executive shall have too many people reporting to him, or too many departments or sections under his control; for where this condition exists the control is certain to be defective. While opinions differ as to the number of people or departments that an executive can effectively supervise and control, there is general agreement that the temptation is to have too many rather than too few.

It is likewise desirable to have the work functionalized as far as possible; that is, no individual should have too many, or too varied tasks to perform. Specialization is no longer a mere theory, but a demonstrated, successful fact, and the office manager who does not carry it to the limit of practicability, consistent with its profitable character, will lose in the effectiveness of his office work and in quantity and quality of output.

Organization Chart

After the question of organization has been thoroughly studied and discussed, it is well to have an organization chart. This constitutes a picture of the organization and serves as a general notice to the employees that the lines of authority and responsibility are as shown there. The drawing of a chart in itself calls attention to the defects which exist in an organization and assists in perfecting it. The final drawing, however, should

represent the situation as the management views it. It should be planned logically and show, not conceal, the real facts. The chart should not remain in the manager's desk—it is by no means a secret or confidential document—but should be prominently exhibited in the office, for all employees to see.

How to Prepare an Organization Chart

An organization chart may be prepared by starting with the highest authority in the organization and working down. The name and title of this individual and the names and titles, if any, of all individuals reporting directly to him should then be listed on a sheet of paper. Taking each of these individuals in turn and following the same procedure consistently, using a separate sheet for each individual who has others reporting directly to him, will eventually bring the analyst to individuals who have no one reporting to them, but whose names appear on the sheets of the individuals to whom they report. If all the sheets are now laid out on a table or pinned on a wall so that all sheets of those on the same plane of authority are in the same horizontal line, the analyst will have the basis of an organization chart, showing who reports to whom. It is then easy to copy the names and titles on to another single sheet, placing them in the same relative positions.

Although such a chart shows the lines of authority and responsibility, it does not show the functions for which each executive is responsible, except in so far as his title may indicate it. It would help if above each individual's name were written the functions for which he is responsible. One result of this step might be to show that the responsibility for a certain function is divided between two or more individuals, while another individual might be shown to be responsible for two or more conflicting functions. The correction of these organization discrepancies would go a long way toward ensuring smoother operation.

It is possible to prepare a functional chart which will show the main functions and subfunctions into which the main functions are logically subdivided. This subdividing can be carried as far as desired, with resulting benefits. One benefit is a comparison of the functional chart with the other chart, to see to what extent functions are logically assigned, as well as if any necessary func-

tions are being neglected. Another benefit of the functional chart is to facilitate the preparation of the organization write-up.

Organization Write-up

In addition to the organization chart, there should be a complete write-up, along the line of current practice instructions, detailing the organization as shown by the chart, but discussing each picture more fully than is possible to visualize it from a chart. Like the chart itself, this write-up should be kept up to date, and any changes should be entered as they are made.

Standard Nomenclature

When it becomes necessary to refer to any subdivision of the office, a standard nomenclature is needed. The word "department" is usually applied indiscriminately to subdivisions, major or minor, and much confusion is thereby incurred. The United States government has standardized its nomenclature in this respect as follows:

Primary classification—department.
Subdivision of a department—bureau.
Subdivision of a bureau—division.
Subdivision of a division—section.

The following standardization of nomenclature, used by the authors, should become the general practice:

Department.
Division.
Section.
Subsection.
Unit.

Control

"Control" is not easy to define or explain. It combines knowledge with power—the knowledge that one's plans and directions are or are not being followed, and the power to compel compliance with one's orders and instructions, that is, authority. Acts based on authority alone cannot be so intelligent or effective as when they are based on adequate, reliable, and timely information, since the possession of such information puts the manager in position to know what to do to bring about the desired results.

The elements of control, then, are authority and knowledge, guidance and direction, constraint and restraint. To be in position to exercise control, the manager must know what the situation is, he must know what it should be, he must know what to do to bring the situation into line, and he must have the authority to take the appropriate action. To bring about control, therefore, the manager must have his lines of communication established, open, and working; he must know what to do under the circumstances, and do it.

There are present, in every management problem, a multitude of elements and conditions, some desirable, which the manager wishes to retain, and others of an opposite character, which he seeks to eliminate or avoid. Controlling, therefore, is the conscious directing or influencing of certain causes so that certain desired effects will result.

A person may possess the title of manager, but unless he exercises a conscious directing influence upon the conduct of the business, unless, in plainer words, he makes things happen that should happen and prevents things from happening that should not happen, he is not managing. On the other hand, perfect control in management is not possible, for perfection always remains an ideal to be striven for, but never wholly attained. The most and best that can be expected is that the balance shall be very much in favor of the manager, and not against him.

The Control of Office Machinery

Let us consider first, by way of illustration, the control of material objects, this being more simple than the control of human beings. What, for example, is necessary for the control of office machinery? Simple as this may appear we shall find that considerable knowledge is required. What knowledge is required for effective control in this respect?

1. *A knowledge of the manner in which the machine does its work* is essential. If this is deficient, it is not possible to utilize the machine to its fullest capacity, and there is, besides, the danger of demanding from it work which it was not designed to do, either in volume or in character.

2. *A knowledge of the capacity of a machine* is also required, so that it is neither forced beyond that capacity nor allowed to operate below it. In the first case, damage or poor work is

likely to occur; in the second, the loss in productive power is obvious.

3. *A knowledge of the peculiar weaknesses of machines* is also necessary, so that they can be guarded against.

4. *Again, the general factors of deterioration, such as dirt, grease, rust, excessive heat and cold, must be guarded against.*

5. *Bearings must be lubricated with the proper kind of oil,* to avoid undue wear of parts.

Control of the Human Element

The control of office employees in relation to their work is analogous to the care of machinery in that it embodies the same general principles. Let up compare all the above points to find their similarity of application.

1. *The manner in which the work is done* should be known. The right and wrong ways of doing clerical work should be recognized and someone should be delegated to see that the work is done in the proper manner. If this is not done, the clerks are left to their own devices, and as a matter of course, the best results will not be secured.

2. *The capacity of the force* must be known. Many managers adhere to the foolish practice of working with an inadequate force, vainly hoping that some day they will catch up with the work. A knowledge of the capacity of their working force would dispel this illusion.

Nor is it wise to try to get the work out by continuous overtime, for this ultimately defeats its own purpose, and clerks become so weary that a long day does not suffice to do a short day's work. While too much work is often expected from clerks, it still more frequently happens that not enough is expected, a condition which arises from the lack of knowledge of what the force can really do. Not knowing the real capacity of an office force is a deficiency that makes scientific control of work impossible.

But here we meet with a condition in which human beings must be differentiated from machines. The capacity of similar machines is to all intents equal, but the capacity of individuals is not. Therefore, to know the capacity of a working force it is necessary to know the capacity of the individuals comprised in it. It is not feasible to figure on a hypothetical average, for to

attempt to operate a working force on that basis would mean that clerks of a large capacity would not be called upon to do their best, and those of smaller capacity would be overworked.

3. *The health of clerks* must be guarded. Every hygienic measure necessary to guard against accident, disease, and infection should be taken, for sickness in an office is a serious handicap to efficient control. Eyestrain should be avoided by the provision of proper light. The office should be kept in the best sanitary condition and should be well ventilated and neither overheated nor too cool for comfort.

4. *Disturbing factors* must be known and guarded against. A very common one is noise, not the noise of a boiler shop, but the constant sound of batteries of typewriters, adding machines, the babel of loud talking, and so forth, noises that would not be noticeable on a busy street but may become distracting in an otherwise quiet office. Excitement of any kind is a condition that should be guarded against. The efficiency of an office, for example, can be utterly destroyed, for the time being, by such a common accident as the fainting of a girl. Chronic disorder, or lack of systematic handling of work, causes great disturbance to the smooth running of an office. Overtime work, though necessary on rare occasions, also acts generally as a disturbing element that is to be minimized as much as possible.

5. *Equitable treatment* of employees as regards pay, hours, regulations, promotion, and so forth, is necessary to effective control, being analogous to the oil on the bearings of machinery, in preventing unnecessary friction. But self-evident as this is, many offices, as will be shown later, pay little attention to it, there being much variation in salaries for similar work, much favoritism, and many irksome and unnecessary regulations.

In all the phases above enumerated, the control of the human element is comparable with, and on the whole analogous to, the control of machinery, but with this recital the analogy ends and the differences begin to appear.

The Psychological Factors in Office Control

The great and fundamental difference between the control of machines and that of human beings is comprised in those factors which we term "psychological." In this sense every individual in an organization constitutes a separate and different

problem. But there are many general conditions in this field, in which the reactions of the human element are sufficiently well known to enable a discerning manager to avoid the disastrous results which are almost certain to ensue when they are neglected or ignored, either deliberately or unconsciously.

There is, for example, a natural resistance on the part of most human beings against arbitrary or autocratic rulings. Each of us—though discretion often prevents open assertion—cherishes the privilege of knowing the why of things, and we rebel—it may be secretly—against the type of manager who openly declares that he wants things done just because he wants them done and does not care for any questions about the matter.

Another feature of this view of control is the undoubted fact that there are certain types of individuals who require a special method of treatment if their fullest capacity for the work for which they are best fitted is to be obtained. This, of course, does not imply partiality, favoritism, or special privileges beyond other workers. Some types of worker will respond to conditions that others will rebel against as, for example, the preference for different kinds of work. We find persons who deliberately prefer work that is generally regarded as monotonous in character, while others have exactly opposite temperaments and prefer variety and sometimes constant change. The fitting of such temperaments to the work which they prefer—and which for that reason they are best qualified to do—is a task that is involved in the achievement of effective control.

When Is Control Present?

A manager may be said to have effective control of an office when the work he has planned to do is always done in the order, time, and manner in which he planned it should be done. As will be seen, this result involves knowing what work is to be done, what the capacity of the office force is, and then coordinating the two under standardized conditions.

All office work is alike in at least two respects—it is office work, and it has to be done. There is also usually a time factor, which is invariably tied up with the quantity of work to be done. There are the facilities with which to do the work—desks, machines, and other equipment; and, finally, the people who are to do the work.

These five characteristics are present in all offices, and the successful office manager is the one who can coordinate these factors so that, when the day is done, the work that was planned for that day is done also. But if the work has not been planned, the chances are that it will not be done, at least within the regular office hours.

In all management work it is highly desirable—in fact imperative— if one is to control results, to have all the conditions under control. The scientific manager approaches only one factor at a time, standardizing the conditions, so that when he has all factors under control he can also control the results. Under such circumstances, in the absence of emergencies, for which allowance must be made, control of results is inevitable.

In every office there are three kinds of work:

1. The work which must be done today.
2. The preparatory work which must precede the work of today.
3. The work which results from the work of today.

These have sometimes been described as preparatory, immediate, and clean-up. In many offices the office manager tries to do all three kinds of work the same day, regardless of the volume of work to be done. Here is where careful planning will help.

Why Planning Is Necessary

A great deal of the office work that is done on any one day need not be done on that day—it may be anticipated or it may be deferred, one or the other, but not necessarily both. By looking far enough ahead, the office manager can smooth out his curve of office-work volume, so that on peak-load days only immediately necessary work need be handled, and on valley days the preparatory or clean-up work may be handled. To do this requires careful planning in addition to a day-to-day knowledge of the work that is ahead. This is not as difficult as it may seem, since all office work is the result of something else—sales orders, the sales campaign which results in sales orders, the statistical work which accompanies or follows the handling of sales orders, and so forth.

Assuming that an analysis of the office work has shown that many tasks may be omitted altogether, that they have been eliminated, and that the best way to do the remaining necessary

work has been determined and reduced to writing, the next factor to consider is the office force. The office force is either competent or incompetent to do the work to be done. If it is incompetent, it is the fault of the manager, who is responsible always. It is also assumed that the equipment of the office has been standardized, that it is suited to the work to be done, and that it is in the best working condition.

When the office manager has standardized the work, the office force, its compensation, the working conditions, and the facilities of the office, he is ready to do some effective planning. Without standardization, satisfactory planning and control is difficult if not impossible; with standardization, the office manager will know how much work each worker can do, and he will know how much work is to be done. Dividing one of these items by the other gives the time it will take to do the work. Let the manager now assign the work accordingly and see that it is done as assigned by those to whom it is assigned, and within the time set.

It should be observed that this presumes a knowledge of the amount of work each worker can do. Relatively few managers of small offices know this figure; and many managers of large offices are not as sure of it as they might be or should be.

Suppose that the manager's survey of the work to be done shows more work than his available force can handle. If that condition is permanent, the office is understaffed, and overtime work will not correct it. If the condition is temporary, temporary expedients may be resorted to, such as a supply of temporary workers on call, a "flying squadron," or the equivalent.

If the survey for any day shows less work than the force is capable of handling, then the manager can schedule some preparatory or clean-up work which he has been holding for just such an occasion—"fill-in work" is the term usually applied, although that description sounds too much like creating work, which is by no means the case.

Conditions Essential to Effective Control

Scientific control, therefore, is conditioned as the following.

1. The manager must know the necessary steps, and the order in which they should be taken, to accomplish with precision and economy certain definite and desired results in every activity

within the sphere of his management. These necessary steps are usually much more extensive than appears on the surface. In routines where the various steps are definitely specified, this is simple; but there are many unrelated tasks in every office which are not connected with any routine.

Of equal importance is the order in which the necessary steps are to be taken, though usually this is not a matter of careful study in the average office.

On certain office tasks, where training outside the office is a necessity, such as typewriting, accounting, and so forth, and on certain other tasks, such as the operation of office machinery, where instruction is given by the service department of the makers of the machines, it will be found that clerks perform their work with a fair degree of precision and perhaps a modicum of economy, but on almost every other office job it may be noticed that the clerks are left largely to their own devices.

2. In the next place, scientific control is conditioned upon the manager's knowing that the means to take the necessary steps are available.

In ordinary practice it is usually deemed sufficient to divide the office into various sections, such as bookkeeping, auditing, statistical, cost, stenographic, filing, and so forth, the work being then assigned to each section. The capacity of any department is judged—usually erroneously—by the costly and unreliable trial-and-error method. If there is apparently more work to do than can be done by the department, they usually begin first by working everybody overtime and finally, when it is indubitably evident that the working force is insufficient, it is increased.

The scientifically constructed and controlled machine or organization works smoothly, with apparent ease and without any obvious strain.

The capacity of a section is limited by the capacity of the individuals composing it, under proper working conditions. And this capacity must be known, not merely guessed at.

Even where it is known, it is necessary also to know what work has already been assigned; for if the capacity is already reached, it would be folly to give more work to the section.

It follows, therefore, that in order to know that the means are available to take certain steps, an intimate knowledge of

the quantity of work to be done is required, and this again requires a further analysis of the subject, to determine what is the normal capacity of the section, the various tasks involved, the state of the work in progress, and the relative importance of the jobs already assigned.

3. The office manager must know that the necessary steps are taken in their proper order, and the results accomplished thereby.

Even the poorly trained office manager usually knows whether or not the work was done, but rarely does he know that it was done properly, or that its performance was not delayed by less important tasks, or that it delayed more important ones, unless he has effective control. Especially is this true of nonroutine tasks, which may seriously disrupt the routine work unless effectively controlled.

In other words, without properly planned control of work, it is apparent that there are great opportunities for waste, through ignorance, lack of training and discipline, to say nothing of deliberate slacking.

The details of office work are so numerous that the office manager cannot reasonably be expected personally to supervise the performance of each of them. He must delegate responsibility and must leave the actual performance of the work to the guidance of others. But he cannot and must not shirk the ultimate responsibility for the correct performance of these tasks, by condemning his subordinates. He can be and should be held responsible for their performance of duties, for that, too, is within his jurisdiction and is part of his duty. Finally, there is but one way in which he can control scientifically, and that is by standardization.

Each function must be carefully and thoughtfully studied by some qualified person, and this careful study will determine the relative importance of each such function. When this is determined, then follows the determination of how the work shall be performed, and how long it should take a first-class worker to do it, and it is at once evident that all this careful and valuable work and its results should be permanently recorded. This record then naturally becomes the standard method of procedure for all who are to perform this function, and with proper teaching and training the workers soon form a desirable

work habit in its performance. Then, and then only, is the office manager relieved of the burden of giving constant attention to its every detail.

Office Work Which Can Be Placed under Control

Five distinct kinds of work can be placed definitely under control in an office, and an analysis of their combined proportions will show that in the ordinary office they constitute from two-thirds to three-quarters of all clerical work done.

1. All daily routine work, such as orders, invoices, and so forth, which is dependent upon the volume of mail arriving. Control of this work will improve the flow and greatly increase the output.

2. Daily work, such as taking dictation, or other work which cannot be standardized as to time, but which can be estimated, and when completed, checked against the estimate. The fact that the work cannot be exactly estimated should not deter the planning room from attempting it, for the estimating of such work will, as experience is gradually gained, improve the accuracy. Also, the fact that an estimated time is set will serve to keep the clerks on their mettle and constantly endeavoring to make good on the estimate. For any serious falling behind, an explanation should be required from the clerk in question, to be regarded not as an excuse but as a reason, and such reasons will be taken into consideration in the planning room when making further estimates.

3. Daily work which can be measured after completion but not in advance, such, for example, as the typing of letters, should be estimated as to quantity assigned, but this estimate is to be checked against the actual measurement. Experience will show how to estimate work of this kind. Thus, a phonograph cylinder or a page of notes will contain an average of so many inches of typewriting. Such work will usually be assigned by the section or department head, and reported but once daily to the central planning room. The section planning room will be run in the same manner as the central room, with assignment sheets, and will make daily reports as to the number of unassigned time units; thus the planning room will know whether or not the section is overmanned, though it will of course take into con-

sideration the daily fluctuations of volume, and will not act hastily.

4. Periodical work, such as tax reports, reports to the management, balance sheets, and so forth, can be scheduled exactly the same as daily routine work, with assignment sheets and an assignment calendar.

5. Special assignments arising from time to time can be scheduled, followed up, and planned on a work unit basis. Previous experience will enable the planning clerk to divide a special assignment into units and figure closely as to the time required; his record of available time units will show him to what clerk or clerks the work can be assigned.

It will not be possible, of course, in the development of scientific methods in the office, to begin planning work simultaneously in all parts of an office where it has not been done before. Standards will have to be set and statistics gathered, all of which requires considerable time. It is not, however, necessary to wait until standards have been set on all jobs, before starting to plan. As a rule, standardization can be done in one section of the office at a time, and, as soon as standards have been set on a routine or other particular kind of work, the planning can begin. As the standardization work proceeds to completion, other sections can be gradually placed under control, until finally all the five kinds of work above mentioned can be planned and scheduled.

In the beginning of the control of any one portion of the work, it is more important to have the schedule met than to have a theoretically correct schedule which cannot at first be met. The workers will not be able at once to jump their efficiency to the standards that have been set, nor should they be expected to do so, if those standards have been properly set. A training period of a month or six weeks should be allowed, and during this time the schedule should be set at, say, 75 per cent of the standards, gradually increasing this as training proceeds, until finally the work is put through at the standard rate of production. That is to say, in allotting work at the 75 per cent schedule, if there are 100 work units, the planning clerk will allow 133 time units or thereabouts for performing it. It should, however, be understood by employees from the beginning that a concession is made.

Questions for Discussion

1. What is meant by "thinking functionally"?
2. Why is the ability to recognize a function helpful?
3. Define or explain "administration" fully.
4. Define or explain "management" fully.
5. What does the management function include?
6. Who exercises the management function?
7. Where should the management function be exercised?
8. What bearing has your answer to Question 7 on the function of office management?
9. Show the parallel of the management function with respect to office, sales, purchasing, credit, and traffic.
10. Could the individuals included in the "administration" also be considered as the "management"? Explain.
11. Define or explain "organization" fully.
12. Upon what does the effectiveness of an organization depend?
13. When does "good organization" exist?
14. What is a policy?
15. Explain the difference between these three questions:

    a. "What shall be done?"
    b. "How shall it be done?"
    c. "Who shall do it?"

16. What is one of the most common difficulties in office organization?
17. What is the first principle of organization?
18. How may responsibility for results be fixed?
19. Define or explain "authority" fully.
20. How many people should report to one executive? Why?
21. "It is desirable to have the work functionalized as far as possible." Explain.
22. What is an organization chart, and what is its purpose?
23. How is an organization chart prepared?
24. What is a functional chart, and why is it helpful?
25. What is the organization write-up?
26. State and explain one advantage of standard nomenclature.
27. Define or explain "control."
28. What are the elements of control?

29. What must a manager know in order to be in position to exercise control?

30. What is meant by "exercising a conscious directing influence"?

31. What five points are necessary for the control of office machinery?

32. What five points are necessary for the control of the human element?

33. Comment briefly on each of the five points in your answer to Question 32.

34. What is the objection to long office hours, aside from the cost aspect?

35. Name and explain some of the psychological factors that the office manager has to contend with.

36. When may a manager be said to have effective control of his office?

37. What five factors, present in all offices, must be coordinated by the office manager?

38. Into what three categories may office work be classed for purposes of planning?

39. Comment on "preparatory," "immediate," and "clean-up" work, with respect to planning.

40. "All office work is the result of something else." Explain.

41. What five items should be standardized before planning and control can be entirely satisfactory?

42. Name three requirements for scientific control.

43. "Five distinct kinds of work can be placed definitely under control in an office." Name the five kinds, and comment briefly on each.

Problem

The Kelley Manufacturing Company was established in 1864 and for many years held a place of prominence in the field—in fact, a practical monopoly. It accumulated a large surplus and its officers were engaged in many local affairs. For the past 15 years, the factory manager and the financial manager have mutually stood in an attitude of armed truce. The secretary, who worked closely with the financial manager, has had charge of the purchasing and the clerks who handle the orders, but there are clerks scattered throughout the factory over whom he has no

control. The clerks in the sales department report to the sales manager. A survey of the clerical work shows that its cost is about double what it should be.

Explain how the company can put in an experienced office manager to work on straightening out the problem here to the best interests of the company, without offending either of the executives.

IV

OFFICE ROUTINES AND THEIR CONSTRUCTION

A casual visitor to an office sees people working at desks, tables, and filing cabinets. Some of the people at the desks are writing; others are telephoning. Some are talking to other people; others are examining letters and papers; still others are operating typewriters and different kinds of machines. If the visitor stays long enough, he will see more or less moving around —people taking papers to other people, going to the drinking fountain, and so forth. From time to time our casual visitor may notice a messenger stopping at certain desks to leave papers and pick up papers.

If the visitor knows nothing about office organization and management, he will simply see a lot of busy people.

If, however, the visitor is a trained and experienced office manager, he will understand what the various workers are doing and why they are doing it. He will know that each morning, and at stated times during the day, the arrival of mail brings orders, checks, bills, inquiries, and other correspondence. He will know that the orders have to be checked and approved for credit before they can be filled and shipped. He will know that the checks will have to be sorted and listed and entered before they are deposited in the bank. The bills will have to be checked and approved before they can be paid, and so on. Every piece of incoming mail has to have certain things done to it before it can be said to have been properly "handled."

This visiting office manager also knows that the prompt and adequate handling of all these items is not a hit-or-miss proposition, but the result of careful organization, planning, and control. He knows that the kind of service the company's customers receive will depend to a considerable extent upon the degree to which the office-management function has received attention and consideration. If the office is poorly organized and arranged,

delays will occur, mistakes will be made, tempers will be ruffled, and general dissatisfaction will be experienced.

It might be well to examine these things and ascertain how a competent office manager proceeds to organize the work of his office.

Organized Routines

One of the most effective ways of performing office work is through organized routines. A routine may be defined as a series of steps in the performance of work, each step in the series being performed in the same order and in the same way every time. There should be a routine for each kind of office work, whenever possible, and all office work of the same kind should go through the routine established for that kind of work.

Let it be admitted that there are some kinds of work which do not lend themselves readily to routinization, simply because they do not occur frequently enough to warrant setting up routines to take care of them; or perhaps because they are specialized cases which come up only once and never again. Even then, however, it is possible to establish a definite procedure for handling everything; such procedures could be called routines, although their worth-whileness might be questioned.

Routines may be divided into two kinds according to their purposes. Some routines are intended to expedite the dispatch of the day's business. Such are the order and billing routines, the invoice and purchase-order routines, and so forth. Other routines are intended to facilitate the work of the people handling the first kind, by means of services rendered to them—such as the mail and messenger services, the telephone service, the filing and stenographic services, and so on. The distinction is clear and should be kept in mind at all times. In passing, it may be well to note that while the facilitating services are rendered to *all* departments, each department may have its own "business" routines, which are often confined within that department. That is, the credit department has routines which do not concern any other department; so have the accounting, purchasing, traffic, and sales departments. Department routines, then, should be distinguished from the routines established to render facilitating services to all departments alike and from routines which pass through two or more departments.

The Formation of Routines

Few office managers are ever called upon to design a new routine for the performance of a particular piece of work, and they have, therefore, little opportunity for doing so. Even in the case of newly organized offices the routines are usually copied from those of some other business in the same or allied lines, few business men having sufficient individuality to cast aside customary imitative habits in this respect and construct a routine based upon their own original thinking. Rather than try to think out one, they find out in one way or another how Smith and Company are doing it, making no inquiry and giving no thought to the question whether or not Smith and Company are competent to devise an effective routine; indeed it will often be found that Smith and Company borrowed from someone else. This wholesale copying of routines from one firm to another results in enormous waste, for the reason that the routine is not strengthened by this continual transplanting but rather progressively weakened. After its establishment such a routine usually grows by accretion, until in the course of a few years a dissection would show that the piece of work had been compelled to travel a most tortuous path. Analysis will usually uncover steps which can hardly be justified.

Getting a Perspective

Every office manager has, however, the opportunity to reconstruct a routine, and most routines that have been established any considerable length of time stand in need of such reconstruction.

The routine in its entirety should be studied before any detailed analysis is made of its various steps, this over-all analysis enabling the observer to secure a proper perspective of the work before him.

The purpose of the routine should first be determined, and just what is supposed to be accomplished by it should be thoroughly and definitely learned. Occasionally, though rarely, the purpose of a routine will not be very well understood by anyone, but, whether this is or is not the case, the observer should endeavor to secure a definite and comprehensive knowledge of such purpose and should not be satisfied with anything less.

In the next place, this preliminary analysis should enable the observer to determine whether or not the purpose is justified, that is, whether the main purpose is of sufficient value to warrant the routine. It is frequently found that routines are based on the assumption that something dire and dreadful—though undefined—would happen without them.

A Detailed Analysis of Steps

The next task will be to make a careful analysis of each step in the routine, in much the same manner as the preliminary study but carried out more minutely. For this work it is desirable to have a set, formal method of analysis. One covering the following points will be found valuable:

1. Name and purpose of step.
2. Is the purpose justifiable?
3. Is the purpose accomplished?
4. Is step performed in right place in routine?
5. Does this step record information that is recorded elsewhere?
6. Does this step duplicate work done elsewhere, in whole or in part?
7. What is the time required to perform this step?
8. Does the order of step interfere with progress or service?

The first point, "the name and purpose of the step," is a matter that requires careful and thoughtful consideration. It will not suffice to guess at the purpose or to assume one, though assumptions are easily made. The true purpose must be ascertained, for unless it is known, the rest of the analysis is useless. It is also very easy for the new observer when he finds (as he is certain to do when making scientific analyses) so many things that are wrong, to contract the habit of assuming that a purpose does not exist. He must neither guess nor condemn without reason; he must ascertain the true purpose.

A few typical purposes of routine steps may be given here:

1. *Preparation for the Next Step.*—The opening of mail is naturally preparatory to the next step—its reading. There are many other preparatory steps, such as sorting, classifying, numbering, and so forth.

2. *Registering.*—There are many sorts of registering steps.

3. *Recording or taking off information,* such as bookkeeping or accounting information, sales, production or cost information, control or timekeeping information. Defining the purpose of

such a step would, of course, include the reason for recording or taking off such information.

4. *Filing*, whether temporarily or permanently, is another very common purpose.

5. *Making of Records.*—This involves card records of various sorts, invoices, bills of lading, and so forth.

6. *Computing of Various Sorts.*—Here there is, again, much unnecessary work, and the purpose should be carefully scrutinized.

7. *Checking to Detect Errors.*—A purpose that should be examined carefully, since many checking operations have no justifiable purpose.

The above, of course, do not constitute all the purposes of routine steps but are listed merely to give the student an idea of what is meant by determining the purpose of the various steps in a routine.

Having ascertained the purpose, the next procedure is to decide whether or not it is a justifiable one. Is it necessary? If so, why? If not, why? The observer should study the matter carefully, and, when he has reached a decision, he should be prepared to explain in detail the reasons for it. A purpose is not justifiable in the following cases:

1. *When No Apparent Reason Exists for Performing the Operation.*—This naturally implies that the definition of a purpose *sounds* logical but will not pass the test of the next question, "Is the purpose justifiable?" For the elucidation of this point some analysts apply the question: "What would happen if this step were not performed?" If it cannot be shown that anything would happen, the purpose of the step is not justifiable.

2. *When the Work Is Duplicated Elsewhere.*—Obviously nothing is gained by performing a step twice.

3. *When the Information or Results Can Be Obtained More Cheaply in a Different Manner.*—For example, a step may involve recording or taking off certain information, and writing it in a book or on a record, for the purpose of classifying. The latter purpose may be fully justified; but if the same results can be obtained more cheaply by sorting, it would not be justifiable to copy off the information on a record.

4. *When the Step Costs More Than It Is Worth.*—In many cases a purpose is justifiable up to a certain amount of expense,

but beyond that it is not justifiable. This is frequently the case with checking operations in a routine.

5. *When the Step Does Not Advance the Routine.*—In such case it is obvious that not to advance the routine is to delay it.

6. *When the Step Delays Progress or Service.*—It frequently happens that a routine will contain a step, or steps, in which certain information is taken off for purposes of sales analysis or other executive records. Usually there is no immediate hurry for such information, or rather it should not take precedence of service to the customer. In such a case the purpose would be fully justifiable if the step were performed *after* the more urgent things were done, but not justifiable if it delayed them. The deciding point here is its position in the routine.

This study completed, the next procedure is to determine whether the purpose is accomplished, for it frequently happens that a step in a routine will have a justifiable purpose which is not actually accomplished.

Is the step performed in the right place? This may have been discovered in considering justification of purpose, or whether or not the purpose was accomplished, but even so, it should at this juncture be reconsidered.

The next consideration, "Does this step record information which is recorded elsewhere?" is not, of course, applicable to every step. In all recording steps, however, it should receive attention. It will be necessary to ascertain where this information is used, kept, or desired, and the inquiries made in such places. Many times it will also be necessary to follow the piece of work beyond and outside of the routine under study to its final destination. This work completed, the next immediate investigation must determine whether the step under consideration duplicates, either in whole or in part, work which is done elsewhere, an inquiry which will follow much the same course as the preceding one.

The next procedure is the determination of the amount of time required to perform the step.

Finally the observer should determine whether the order in which the steps appear in the routine delays the progress of the work through it, for work can often be speeded up and operations eliminated by merely changing the order of the steps.

If the steps of a routine are thus thoroughly analyzed, many interesting facts and conditions will be disclosed and much valuable information obtained which will assist the observer in the rebuilding of the routine. However, before the actual work of redesigning it is started, he should describe carefully in writing the whole routine as it exists, adding to this description any observations he has made of its weaknesses.

Visualizing the Problem

It is always an aid to constructive thinking actually to visualize problems of this kind, that is, to construct a visible picture which will enable one quickly to grasp the main factors it involves. There are various kinds of devices which may be used for this purpose; variously named, "graphic routine chart," "work chart," "process chart," "flow chart," "procedure chart," "operation chart," and so forth. Sometimes the word "diagram" is used instead of "chart." The name is not important; the purpose is. The mere making of pretty pictures is neither a valid purpose nor an excuse for wasting time and money on a chart. The only valid purpose of a graphic routine chart is to bring out forcibly and visibly certain leading facts. This purpose may be either to enable us to think more clearly ourselves, or to enable others, with whom we intend to discuss the matter, to perceive clearly certain facts that we desire to impress upon them.

The leading facts in a chart should stand out clearly and should be simple and obvious and easily grasped by anyone. Defects or special points should be emphasized.

The chart should also be simple to prepare. A rough pencil sketch which serves the purpose it is desired to accomplish is preferable to an elaborately prepared and beautifully drawn chart which falls short in this respect. The amount of care, skill, and time devoted to the construction of the chart should be compared with and proportioned to the size and importance of the investigation. The query, "Is it worth what it costs?" applies to the work of the investigator exactly as it does to that of the clerk on the routine.

Some of the standard forms of routine charts will now be described.

The Steps-in-squares Chart.—An example of this form is Fig. 1. It is used frequently and is simple to prepare but is somewhat defective in that it does not visualize the problem very clearly and its import is not easily and readily grasped. All it shows at a glance is the nine steps through which the work passes; and to learn what these steps are, the wording in each must be read. If this information were typed in condensed paragraphs the same purpose would be accomplished at much less cost.

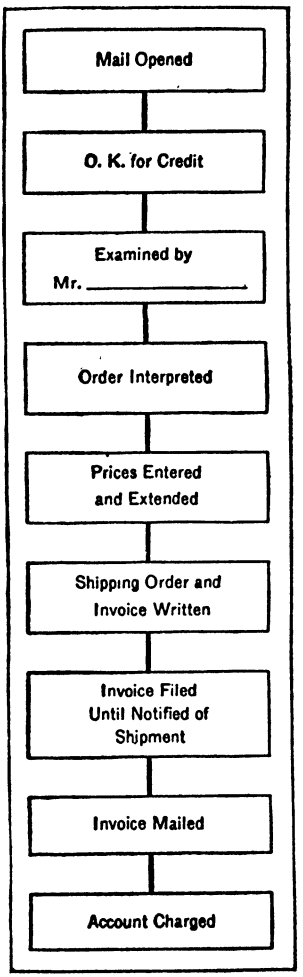


FIG. 1.—Example of the steps-in-squares chart.

The Form Chart.—Sometimes a chart in which the actual forms themselves are illustrated is used. This is done by pasting the forms on a large card together with the necessary descriptions, and then, by the photostatic process, reducing the whole to a standard size. This method certainly gives a complete picture of the whole routine, but the amount of detail is so great that it is not readily grasped. For purposes of analysis this is not a good chart, though it can be used for recording practice after a new routine has been established through the method of scientific analysis described in Chap. XXI.

The Isometric Flow Chart.—It is occasionally necessary to trace the path of a piece of work, visualizing not only the steps, but the part of the office through which it passes. This can be accomplished by constructing an isometric (a conventionalized form of perspective drawing) flow chart, as illustrated in Fig. 2. This type of chart gives the impression of looking into the building itself, with the walls cut out to show the interior. The movement of work, not only from department to department, but from floor to floor,

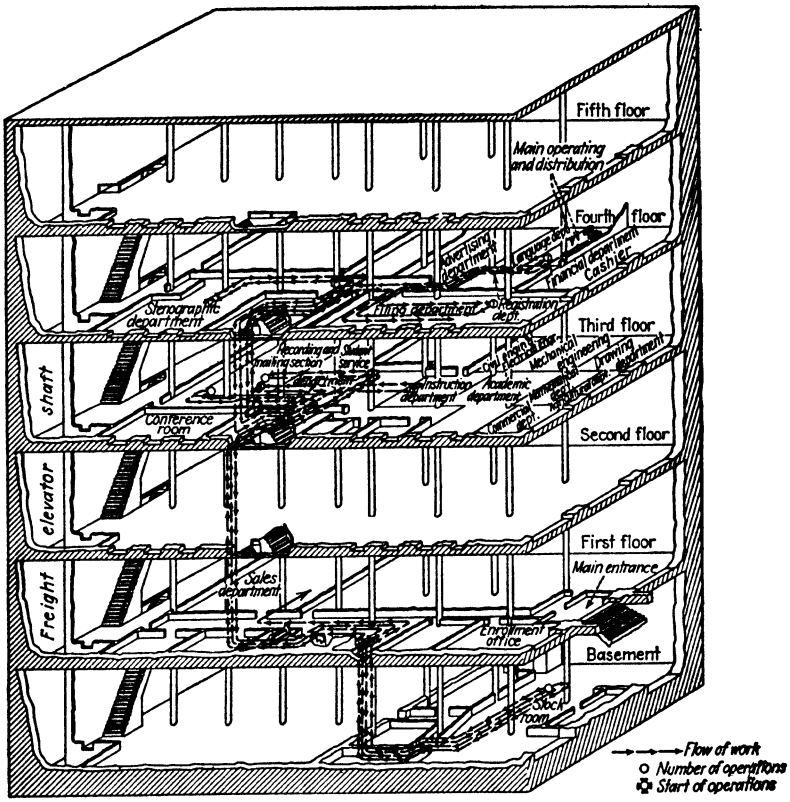


FIG. 2.—An isometric flow chart.

is shown by heavy dashed lines with arrows to indicate the direction of the flow. This form should not be used in ordinary analysis, for it is entirely too expensive. An isometric flow chart based upon approximately correct allocations of steps is sometimes used, but this form of chart, so used, approaches dangerously close to the "pretty-picture" class, though it is not so intricate or difficult to draw as the other example.

The Cross-analysis Chart.—These charts, illustrated in Fig. 3, are very generally used and serve most purposes admirably. Their import is readily comprehended, defects stand out clearly, and the whole can be shown in comparatively small compass. It is, besides, a form of chart that can be easily prepared, and, if necessary, the lettering can be done on a typewriter.

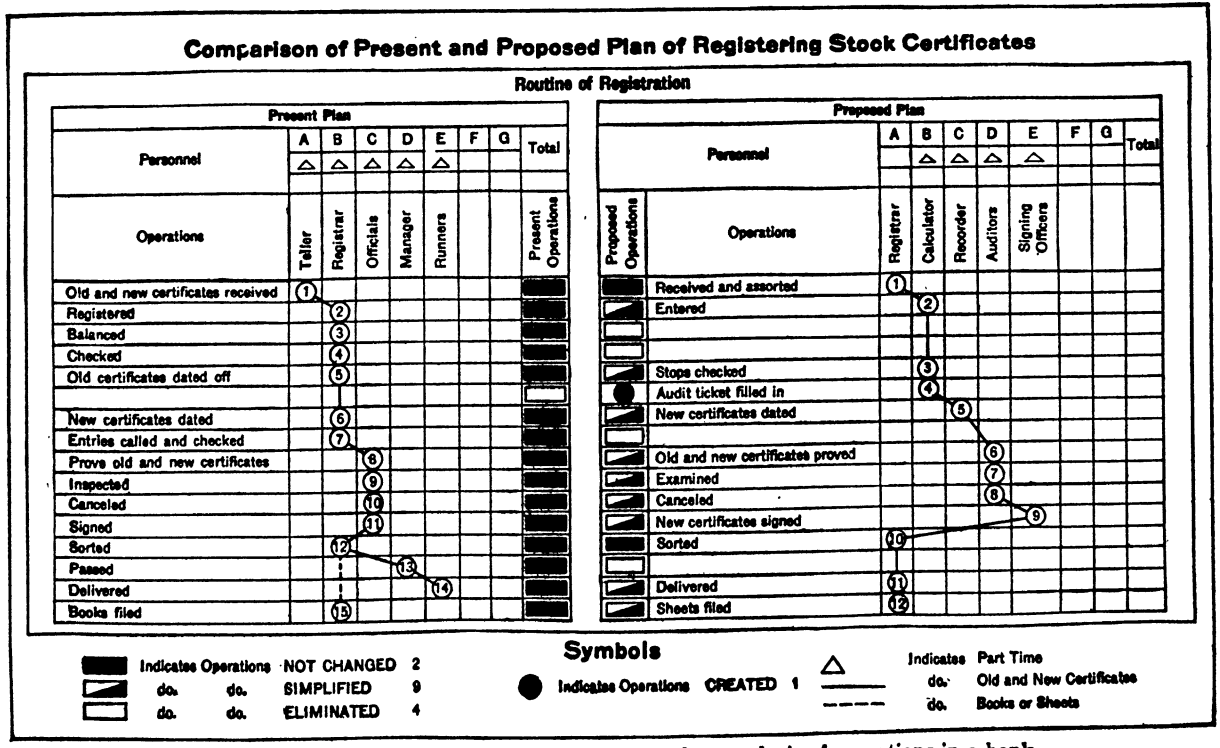


FIG. 3.—Cross-analysis charts showing the result of an analysis of operations in a bank.

The "Neck" Chart.—This form is exceedingly valuable for the specific purpose of illustrating the evenness or unevenness of time on each operation. The example shown in Fig. 4, on the following page, very distinctly exhibits two necks which seriously interfere with and prevent an even flow of the work.

The Final Analysis

First a general over-all analysis was advised, so that the observer might secure a comprehensive perspective of the routine; then an analysis of each step was prescribed for the specific purpose of discovering defects in the *routine.* Now it is necessary to make a final analysis of each step, with the object of discovering defects in the *steps.*

This analysis, though necessarily of a more microscopic character, is nevertheless, in the making, identical with the scientific analysis of an operation. The necessity of the step must be considered, the method used must be critically studied, and the amount of time required carefully observed for the purpose of determining "necks" and other interferences with the "flow." The amount of training necessary should also be considered in order to determine whether it is given or not, and the observer will look carefully for ineffective or superfluous motions that may be eliminated. In making this study, each operation should be written up, showing the present method, elaborating upon defects discovered and suggestions offered for improvement.

If the observer has carefully followed the previous instructions, he will, by this time, have a thorough knowledge of the purpose of the routine and whether or not that purpose is accomplished; he will also possess the same knowledge concerning each individual step in the routine, and finally he will have determined whether or not the methods used in these steps are the best, and if not, he will have devised "the one best way."

It is impossible to overemphasize the importance of thoroughness in making these analyses. If the temptation to jump to conclusions has been successfully resisted, the new routine may now be built by observing carefully the following principles.

Principles Underlying Establishment of Routines

The following nine principles should govern the work of establishing routines:

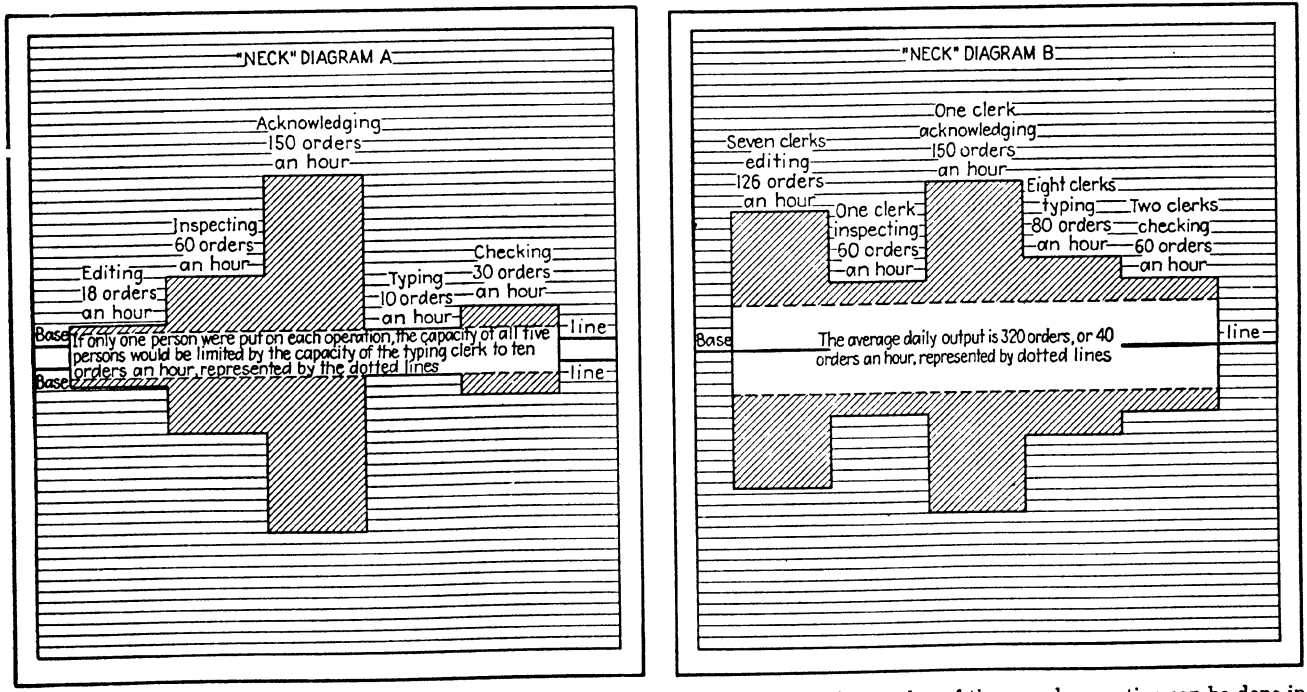


FIG. 4.—These charts bring out clearly the "necks" in the routine, by comparing the number of times each operation can be done in an hour with the average number of orders going through. The number of orders that can be handled is limited to the number that can be handled at the "neck." The remedy is to put more clerks on the "neck operation" or else teach that operation to some of the clerks on other operations, so they can help in times of need.

1. *Every step must have a justifiable purpose.* The inclusion of a registration step, for example, may or may not be justified, according to circumstances, but it should be very carefully considered. If the work is under close control, a registration may be entirely unnecessary. Checking operations, also, are peculiarly likely to be added and no attention given to their justification.

2. *Each step must advance the work.* This caution may seem unnecessary, but frequently steps are interposed which do not advance the work but rather retard it. In an order routine, for example, the order may go to a certain person for examination; this may be unnecessary, but the step has been added because Mr. X has the fixed idea that unless he personally examines each order something is bound to go wrong.

3. *The order of each step should be such that records required to be taken off will not delay the service.* Steps where records are taken off purely for sales analysis purposes, for instance, are very properly placed at the end of the routine, where they will not interfere with the progress of the order.

4. *Equality of the time required for each step should be striven for, or means provided to eliminate "necks."* It is not entirely possible to avoid inequalities of time, but it should be at once apparent that if in any routine, steps 1, 2, 3, 4, and 5 can be performed at the rate of 200, 50, 100, 75, and 30 pieces per hour, respectively, the flow of work with one person on each step will be very uneven, and eventually the work will pile up at step 5, while all preceding steps will be working away below capacity. This unevenness of flow can be corrected by putting more people on the slow operations and by combining some of the fast ones. Under ideal conditions, each operation requires about the same amount of time, or else the capacity is equalized.

5. *Guard against duplication of work.* Many routines, constructed without sufficient care, require the doing over and over again of some one thing, such as writing the customer's name. In one routine that was studied, the name and address of the customer were written no less than 23 times.

6. *Avoid needless writing.* In many routines half the writing done is superfluous and can be eliminated by a careful study of what is absolutely necessary in this respect and what is not.

7. *Needless effort should not be expended.* Savings amounting to 25 per cent of the effort required to fill out a form can often be made by redesigning it along certain specified lines.

8. *Make as few exceptions as possible to the general routine,* for their very existence tends to defeat the purpose of the routine. Exceptions can often be classified and handled in special routines by themselves, thus making it possible to proceed with the balance of the items in a general routine manner.

9. *Avoid needless checking.* In almost every office routine there is a constant danger of making errors—in fact, there is a certain irreducible minimum of errors that must be expected and allowed for; it is naturally the aim of every office manager to make as few errors as possible and to detect those made before the work is completed, if that be possible. This desire leads to the interpolation of various checks along the route, and sometimes this checking is carried to such an extreme as to cost more than the errors would cost if allowed to pass uncorrected. If the checking is done at the end of a cycle of operations, it should be sufficient for all practical purposes and should accomplish the desired result as nearly as it can be accomplished with a minimum of effort.

Synthetically Building the New Routine

In this work a formal method of procedure should also be adopted.

First, all superfluous steps or motions should be eliminated, and, where necessary, new methods should be devised.

Second, the order of the various steps should be determined.

Third, a steady and even flow of work through the routine should be provided for—an extremely important provision, for a very large part of the waste to be found in office work is due to uneven flow. Of course, there are certain determining factors, not amenable to control, which will have to be considered and allowed for, such as the arrival of the mail, daily fluctuations of work, and so forth.

Fourth, correct working habits should be prescribed and developed for performing the work in the one best way. Much depends upon this, for the difference between the expert and the "dub" is very marked in every office operation, such difference being mostly comprised in the working habits.

Fifth, the best tools and equipment should be scientifically determined and provided for the performance of each step, after which the method of their use should be prescribed.

Sixth, clerks should be properly trained to perform the work and especially to "make decisions" upon it quickly, for most operations require that a decision be made as to which of several things should be done. These decisions are mostly very simple and are based upon policies determined by the management, so that they do not demand profound original thought on the part of the worker. Nevertheless, they are decisions, and if the worker is slow to decide which move to make or which thing to do, the over-all time required for the operation will be greatly increased.

Seventh, habits of speed should be developed, for whether a clerk works slowly or speedily is also a matter of habit; and where speed is requisite, the habit must be inculcated.

Lastly, accuracy is essential. This, too, is a habit and must be developed. Inaccuracy is mainly due to lack of concentration, and this in turn to lack of interest in the work; therefore, such interest should be cultivated and the importance of accuracy emphasized. It may be noticed that we have placed the development of accuracy last, though it is commonly assumed that it should be developed first.

But if too much emphasis is placed upon accuracy before the clerk has learned correct methods of working, the habit of indecision will become fixed, and it will be impossible to develop the habit of speed. The correct order is (*a*) right working methods, (*b*) the habit of speed, and (*c*) accuracy. In this sequence the emphasis is first placed upon right working methods, so that the worker may perform them subconsciously or with little conscious thought. When this has been achieved, the habit of speed is then quickly developed, as there are no inhibitions as to motions, and when both have become habits, the insistence upon accuracy does not then interfere with or cause a slowing up of the work.

Additional Considerations

To avoid confusion of thought, the consideration of the different kinds of routines has been left untouched until now. While the same general method is applicable to all routines,

there are usually some predominant factors to which special attention must be given.

While a routine should invariably be designed with its main objective in mind, it must not be assumed that the objective will always be the same. For example, it may be imperative that above everything else a routine should be designed with a view to giving speed and service. In making a sale, the management of a department store must always keep in mind that the customer objects to waiting, and, in order to serve the customer promptly, all other considerations must be subordinated to speed. On the other hand, the dominating factor may be accuracy and care, and speed may not be a factor at all or, if so, a very minor one. The preparation of an executive report may be cited as a case in point. It is of the first importance that such a report be accurate, neatly prepared, and well arranged, and though it should be completed on scheduled time, it should not be rushed.

Economy of operation is another consideration that is sometimes dominant. A mail-order house, which labors under many disadvantages in competition with local dealers, cannot afford to spend too much for clerical work, and each routine must be designed with this limitation in mind.

But whatever the dominating objective may be, it should be thoroughly understood and the routine designed accordingly.

Questions for Discussion

1. Two people visit an office. One is an office manager; the other is not. What does the first one perceive that the other does not?
2. Define or explain "routine."
3. Are there any kinds of office work which may not be routinized? Explain.
4. "Routines may be divided into two kinds, according to their purposes." Explain.
5. Why is it desirable to keep clear the distinction between the two classes of routines?
6. How are the routines of many offices formed? Why is this so?
7. Why is imitation of other people's methods likely to be a futile proceeding?

8. Why should a routine be studied as a whole before a detailed analysis is made of its various steps?

9. In making a detailed analysis of the steps in a routine, eight points are suggested. What are they?

10. Mention several typical purposes of routine steps or operations, and comment briefly on each.

11. Under what circumstances is the purpose of a step in a routine not justifiable? Comment briefly on each of these circumstances.

12. Why is it desirable to determine whether the purpose of a step in a routine has been accomplished?

13. "Does this step record information which is recorded elsewhere?" Comment on this question and the point to which it refers.

14. How may a routine be visualized?

15. What is the only valid purpose of a chart or graph?

16. What is the steps-in-squares chart? What are its advantages and disadvantages?

17. What is the form chart? What are its advantages and disadvantages?

18. What is the isometric flow chart, what does it show, and what are its advantages and disadvantages?

19. What is the cross-analysis chart, and what are its advantages?

20. What is the "neck" chart, what is its purpose, and what does it show?

21. What is the purpose of the final analysis of each step in the routine?

22. State nine principles underlying the establishment of routines, and comment on each.

23. In synthetically building a new routine, a formal method of procedure should be adopted. What are the eight factors in this formal method?

24. How much emphasis should be placed upon accuracy in the performance of work?

25. Is the dominant objective of one routine the same for all other routines? Explain.

26. Of the following possible main objectives of routines, which is the most important for a particular routine? Explain your answer.

a. Giving speed and service.
b. Accuracy and care.
c. Economy of operation.

Problem

The Jenks and Keane Pharmaceutical Company sell directly to druggists. They have been established for many years and have built up an elaborate order-handling routine involving 21 steps. An investigation shows that the clerical minutes per order ratio is 148, and that it costs approximately $1.62 for labor to handle an order. "Hand-to-mouth" buying by their customers has brought down the average size of order to $42.00, but this average does not show the whole picture, for further study discloses that 54 per cent of the orders have an average value of only $12.64. Manifestly, the company cannot afford to pay $1.62 to handle an order of that size.

Build a special routine to handle these small orders.

V

FLOW OF WORK

Flow of work is concerned with the way work moves along from one operation to another—the quantity or volume of work going through, the rate at which it moves along, and the smoothness of its passage. A steady, constant flow of work through a routine will result in high efficiency; and if the flow is obstructed or interrupted, there will, on the contrary, be a much lower efficiency, owing to wastage of time on the part of clerks waiting for work; for unless a clerk is supplied with sufficient work to keep him steadily employed during the entire working day, his efficiency will be low even though, when he is working, he works at a high speed.

To illustrate this condition in homely fashion let us make analogy with the flow of water through a pipe, the caliber of which differs in size at some place or places, throughout its length. The amount delivered at the end of the pipe will not depend upon the size of the opening to the pipe, the size of the faucet through which the water flows, or the average internal diameter of the pipe itself, but upon the size of the smallest caliber in the total length of the pipe. If its average diameter is 2 inches, but if in even one place only it narrows down to ½ inch, the amount of water that flows through the pipe, in a given time, will be but that which can be delivered by a pipe of ½-inch caliber all through its length. If this small opening is somewhere near the middle of the pipe, the water will dribble out at the other end slowly, whereas if it is near the discharging end, the water will emerge with greater force though there will be no greater volume than would pass through a pipe of ½-inch diameter.

An office may in some places have a great capacity for getting out work, just as a pipe of uniform internal diameter all through its length will deliver its full capacity; but if the work does not flow steadily and evenly, owing to some obstruction in the routine, it will not be able to deliver its full capacity at the end.

Or to state the matter more expressly in terms of work, let us assume that there are 10 consecutive operations to be performed on a particular piece of work, each requiring the same length of time, and each operation manned by a competent clerk. If sufficient work is given the first clerk in the chain to keep him busy, and he passes it on to the next, who in turn passes it to the next, and so on, all 10 clerks will be busy and will turn out their full capacity. If, on the other hand, the first clerk gets, during the first hour, sufficient work to keep him busy for two hours and, during the second hour, work sufficient to keep him busy for only half an hour, and in the third hour there is no work, but one hour of work comes with each succeeding hour afterward, it is easy to calculate what the final result will be. Each man will be short an hour and a half of work, but this shortage will pass like a wave from one man to the next, and the last man will be busy when all the others have finished, the length of time being dependent upon the interval between the passage of each piece of work.

In these simple illustrations the importance of flow of work is easily discernible, but when it is considered that in the office there are many streams of work flowing in many directions, some reaching the final stage quickly and others wandering here and there throughout the organization, perhaps for days, the actual problem is by no means so simple as the illustrations given would suggest nor is it always easy to detect exactly where the obstructions lie. It is evident, however, that obstructions will interfere with the flow.

Flow of Work a Management Problem

It is evident that flow of work is a problem to be solved by the management and not by the clerks. This does not mean that the management can always control absolutely the flow of work, but it can take steps to minimize the effects of any uncontrollable factors that may be present or anticipated.

In some cases, lack of equable flow may be due to a cause that is altogether outside the control of the management; for example, when orders come in by mail, one day's receipts may be very heavy and another very light. If the office is manned to handle the heavy day, it is obviously overmanned for the light one. Again, if orders come in by telephone or by person, work may

be very heavy at certain parts of the day and very light at others. Such causes are, of course, practically beyond the control of the office.

But in the majority of cases where flow is impeded, the cause is due to certain internal conditions which are well within the control of the management. Some particular department, for instance, may, because it is undermanned, hold up the work of another, or again the same result may be produced because the department is engaged on other work part of the day.

Another impediment which obstructs the flow is frequently contained in the routine itself. If the time required to perform a piece of work on one step is greater than is required on other steps, the work will obviously remain at that step longer, and succeeding operations will have to wait. This case is illustrated in Fig. 4 on page 69.

One of the chief causes of defective flow within the routine itself is due to lack of standard methods for moving the work from one operation to another.

The progressive assembly plan, worked so effectively in the Ford automobile factories, where the component parts of a machine start from so many sources and pass from one operation to another, gradually seeming to assemble, until finally a completed car rolls out of the factory on its own power, is a great modern principle of production, which applies with equal force to the production of office work. That principle may be stated as follows:

In cooperative production the time and labor required to transport materials from one production unit to another add nothing to the intrinsic value of the commodity, but increase its cost. Excessive transportation increases not only the cost but also the possibility of delay and consequent loss of production through interruption to the flow.

The Unit Plan of Flow

The unit plan of flow may be described as follows: A unit may be any number of pieces from one up. As soon as one unit is finished on any operation, the work is passed to the next step. If the unit consists of, say, 10 pieces, work will flow from one step to another in units of 10; if the unit is 1, it will flow 1 at a time. The size of the unit will depend upon the

number of steps in the routine and the length of time it is desired to have the work take. If the number of steps in a routine is 20, and the average time required for each step is 1 minute, the order can flow through all the steps in a little more than 20 minutes, if the unit is 1 piece; if it is 10 pieces, 200 minutes would be required. The unit plan of flow is, therefore, an organized method, and undeniably superior when contrasted with the haphazard process of flow found in most office routines.

Theoretical Capacity

The amount of labor time required on any group of operations is the sum of the labor time required on each unit, plus the necessary time for travel from one productive unit to another. This is known as the theoretical capacity, but very seldom in office work is this even remotely approached, and the chief reason for the deficiency is loss of production through lack of flow.

Assuming that there are 10 operations, requiring 1 minute each to perform, in the cycle of operations in a particular routine, like, let us say, the handling of orders, the theoretical time would then be 10 minutes plus the amount of time required for the work to pass from one operation to another through the cycle. If the necessary travel time were 1 minute for all 10 operations—that is, 6 seconds for each—the labor time required would be 11 minutes per order. Ten persons working 8 hours a day would have 4,800 working minutes and their theoretical capacity on the above assumption would be 436 orders daily. But even in the best organized office this would not be possible because of the difficulties in the way, some of which cannot be wholly surmounted. In the unstandardized office, perhaps 40 per cent of this theoretical capacity is achieved, the remainder being unobtainable. This is a modest estimate based upon years of experience with many offices.

Usual Difficulties Encountered

There are many difficulties in the way of getting this ideal flow of work—the full theoretical capacity—in an office, which prevent the office manager from obtaining it from his working force.

1. *The Volume of Work to Be Done Is Unequal.*—The times of its arrival are not regular, one day's work being heavy and

another light. The work arriving in the first mail is usually much heavier than in those subsequently received during the day. There are seasonal fluctuations in volume—a difficulty, which, though it can never be entirely overcome, can be foreseen and planned for and the loss of capacity thereby greatly reduced. If the volume of work is known from day to day, statistics can be prepared which in the course of time will show what may be expected in both seasonal and daily fluctuations. It is a simple matter, of course, to have a force sufficiently large to handle the peaks, but this provision means a loss of capacity in the valleys; so a decision must be made as to the best average force to be maintained, which will result in the least loss of capacity.

2. *Interruptions to Work.*—If an analysis of all such interruptions is made it will be found that many of them can be foreseen and prevented, so that only a limited number will be unavoidable. The following are some of the most frequent interruptions which occur daily in most offices:

a. Lack of Material with Which to Work.—This may be caused by bad planning, bad scheduling, or a complete lack of either or both. "Lack of materials," in the sense employed for that phrase here, usually means that there is no work available. Stenographers especially waste an enormous amount of time because there are so many intervals in which they have no work to do. Clerks on routines will have many short idle periods during the day, which, because of their brevity, pass practically unnoticed, especially in the case of those "experienced" clerks who know how to stretch 30 minutes of work over an hour, if necessary to fill a time gap. This is not to be classed as a "stalling"—clerks have learned by experience that when lack of work is the fault of the management, it must not be proclaimed too loudly by visible idleness and must not be made too apparent. Hence, they are in reality concealing the fault of the management, not their own. Though it would be actually better for the management to allow the clerks to sit idle during these periods, because by that method the deficient flow of work would instantly become noticeable, the latter know that they will be reprimanded if found doing nothing.

b. Information Required Is Not at Once Available.—This is a very common and most prolific cause of delay and interruption of work. A correspondent gets everything ready to prepare a

letter and then discovers there are certain parts of it that he cannot write until he gets further information, so he holds up the stenographer while he telephones or sends someone to get it.

c. Changes of Work through Change of Plan.—Many interruptions occur upon this account.

d. Changes of work because of poor planning is also a frequent experience.

These are but a few of the many obstructions which interfere with the daily flow of work. Some of them may be inevitable and inescapable, but many of them can be entirely prevented.

3. *Unequal times required for different operations in a routine* constitute a most prolific cause of interference with flow. If each requires a different time, varying from, say, 30 seconds to 2 minutes, the clerks on those operations requiring the shortest time will be idle a large portion of the time, while those with the 2-minute operations, though continually busy, will still form "the neck of the bottle."

4. *Lack of Standards.*—If these are lacking there will not be an equal—or even approximately equal—amount of work done by the various clerks, and this in itself will interfere with the steady flow.

5. *Lack of Planning.*—This condition can be corrected only by the installation of planning methods.

6. *Lack of Scheduling.*—Without planning there can be no scientific scheduling, and this in turn adversely affects the steady flow of work.

Chapters XXI to XXIV will be devoted to a consideration and explanation of the technique by which scientific management may succeed in eliminating or minimizing these difficulties.

Questions for Discussion

1. Define or explain "flow of work."
2. Why is the flow of work an important consideration?
3. What are some of the causes which impede the flow of work?
4. How could you show some of these causes graphically?
5. State the principle of progressive assembly.
6. Explain the unit plan of flow.
7. What is the theoretical capacity of an office? Why is it seldom reached?

8. Name and comment briefly on each of the six stated difficulties in the way of getting the ideal flow of work in an office.

Problem

In the office of the Carter Hosiery Company, the order and billing department handles 300 orders daily. The number of workers in this department is twice, theoretically, what it should be. Although there are idle periods, for the most part everyone seems to be exceedingly busy. It is stated that the reason for this is the large number of back orders due to the shortage of certain numbers, which necessitates much recopying of orders.

How would you analyze this situation to discover the apparent loss of time?

VI

FACILITATING THE PERFORMANCE OF WORK—OFFICE SERVICE—MAIL AND MESSENGER

The effectiveness of office workers is directly affected by the excellence of those services which are designed to facilitate the performance of their work. If the mail is late, the work is delayed, even disrupted, in some offices. If letters and papers cannot be found in the files, the ensuing situation is more than unfortunate; it may be tragic. If the telephone service is inadequate, so that customers calling the office from the outside get the busy signal, and those inside cannot get the line, there is not only delay, but exasperation. If certain forms or supplies suddenly run "out of stock," important matters may have to be deferred. If an executive cannot get a stenographer when he is ready to dictate his correspondence, he is more than annoyed; he is likely to be downright critical. And with reason.

It will be observed that two results may be expected from inadequate or inefficient office service. First, is the effect on the work; second, is the effect on the worker. While both are important, the second is more costly in the long run, since sooner or later even the competent worker, who may be constantly baffled in his efforts to earn his pay, will eventually cease trying and will gradually take the attitude, "Oh, well, if the company doesn't care, why should I?" When this stage is reached, there is a loss of interest and ambition, a loss of perspective, and the development of slipshod methods of work. The best-laid-out routine will creak sooner or later if it is not kept well oiled by the facilitating services.

Whether or not these facilitating services should be centralized is less important than the fact that, whether centralized or not, they should be so well organized, directed, and controlled, that everyone in the office comes to depend upon them; that dependence can come about only by rendering so excellent a service that the office force can absolutely rely upon it. For example, if an

internal mail service is provided to facilitate the interchange of letters and papers between desks and between departments, the confidence of those for whom the service is provided will be won or lost by the excellence of the service; that is, the certainty, first, that the messenger will call at certain stated times; second, that his calls will be frequent enough to overcome the always present temptation of the desk worker to deliver his own papers in order to get prompt action; and third, the exactitude with which the letters and papers picked up are delivered to the proper points.

These are not matters of chance; they are features which can be established and controlled to a nicety. And because one of the simplest ways to increase the output of each office worker is to make it unnecessary for him to leave his desk in order to take papers to others, thereby interrupting and delaying his own work, the problem of office intercommunication will have our attention first.

Office Intercommunication

In the conduct of office work, communication of thought, whether written or verbal, is an indispensable element, its total absence being in reality inconceivable. Such communication is either internal, between one person and another in the office, or external, from those within the organization to persons outside of it. When, through the growth of the establishment, the mass of this work becomes so great as to attract attention, means are sought to shorten the time required for it, but very rarely is the problem thoroughly analyzed and all available means used to save the time and energy which, like every other office activity, it must consume.

Internal communication, like many other office problems, is one that is rarely considered at all, until necessity compels its consideration, a condition which is easily explainable and, possibly, to some extent justifiable. In a very small organization, say, of 8 or 10 people, it does not exist as a problem, for those in the office can easily, and with little effort, communicate with each other orally. With 15 or 20 people, the need for better intercommunication begins to take shape dimly, but, as the pressure of the need is not distinctly felt, little attention is paid to it.

With 100 clerks, it becomes more distinctly formulated as a problem and compels a certain amount of attention, and as the organization grows larger it becomes ever more pressing and important as a problem that insistently demands a satisfactory solution, its vital importance increasing in something like geometrical ratio with the growth of the business.

It is easily obvious why this should be so. A larger volume of business requires a large force of clerks to handle it; these people in turn require a larger amount of space and are distributed over an increased area; this wider distribution makes the necessary communication between them more difficult, and there will be much walking back and forth between them for this purpose, unless some means is adopted to prevent it and save the time thereby expended. Again, a larger business has the effect of making competition more keen. A small volume is easily handled, and competition, being but slightly felt, is unnoticed, but, as the organization absorbs more and more of the market, it develops ever-increased resistance from competitors, and competition thus becomes a distinct deterrent to maintaining volume, unless means are devised to neutralize or at least mitigate its effects. This generally takes the form of each firm's striving to give more to the customer in the way of service, and improved service and quicker deliveries involve more and more intercommunication work. Thus, it will be seen that the difficulties and increasing importance of the subject are entirely due to the growth of modern business.

In turn, the development of modern business itself has been vitally dependent upon the constant improvement of methods for communication.

Wherever communication is conducted by primitive or even obsolete methods, it has a deterrent effect on the growth of a business. These considerations serve to show beyond question the fundamental and vital character of the subject of communication as an element in the conduct of modern business.

It may be noted that there are certain factors or rather necessary elemental practices in office organization, which tend to reduce the number of communications that would otherwise be necessary, some of them—though by no means devised for that purpose—acting automatically to that effect. Others again are the conscious results of thought devoted to the subject.

Different Forms of Intercommunication

Let us now analyze the different forms which intercommunication takes in modern business.

1. There are the notices that certain things have been done, which are more or less records, sometimes of a formal character, and which may or may not impel further action. When a clerk punches the time clock in the morning, the act not only obviates the necessity of reporting personally to a superior officer but communicates the fact of the clerk's arrival to the management, and the exact time of his arrival likewise. When a clerk makes up a list of the cash received and turns it over to the cashier, he is communicating thought, making a record of it, and at the same time delivering the cash to the proper person. It is true that these activities are rarely considered as examples or types of office intercommunication, but they are essentially so in character.

2. Orders to do certain things, requests for advice, notices of happenings, which usually impel further action and involve further communication. This type of office intercommunication perhaps represents the largest portion of the problem.

3. Reports of progress on different phases of the work, which may or may not involve further action or communication. This also constitutes a considerable proportion of the office intercommunication.

These communications may be either oral or written. If the former, they may pass between persons face to face, which involves a certain amount of travel to the meeting place, or they may be transmitted over a distance as by telephone. If they are written communications they may be either formal or printed memorandums with but little writing, or they may be special letters or memorandums either of passing importance, or of some future importance, such as records and reports.

The Main Factors of the Problem

The number of these communications, their frequency and length may be considered as the main factors of the intercommunication problem.

A small volume of intercommunication presents no particular difficulties; a medium volume usually suggests the beginning of

methods for obviating the most annoying of the wastes occasioned, but it rarely impels the office manager to make a study and analysis of the subject. In such case, whatever methods are adopted will perhaps partially ameliorate the condition, but many opportunities for effective correction of the evils will be overlooked. With a large volume of intercommunication, the difficulties increase, not only as to the economy of the methods, but as to their effectiveness also. The condition is such as to justify the most careful study, but it is usually left to the representatives of some particular mechanical device to suggest a solution.

The frequency of the messages is the next factor. If in the nature of the work there are a large number of communications in a short period of time, many difficulties are involved.

Finally if the messages are long and each occupies an appreciable amount of time in transmission, the intercommunication facilities are soon overtaxed.

These three factors are the basis of each problem of intercommunication, but the methods of solution involve many others.

There are two possible methods of solving the problem of transmitting written messages, namely, by messengers or by mechanical devices.

Organizing a Messenger Service

The most primitive form of the messenger in the business office is the old-fashioned page boy, an employee used, as a rule, for the delivery of one message at a time. He is summoned by a buzzer and instructed to deliver the message at a certain place, and he makes a special trip to do so. It is somewhat remarkable that this obsolete method still survives in many places where the messenger work could be readily organized. Its waste does not seem apparent, or else the executives using it seem to think it adds to their prestige to have persons at their beck and call, to run their errands notwithstanding the expense. But in most up-to-date offices, an organized internal mail service does this work much better, more expeditiously, and at far less cost.

Unless well organized, the internal mail service, however, will help but little. If the delivery periods are as much as an hour apart, there will be many occasions when an executive who does not wish to wait an hour to have his message delivered by the regular service messengers will use his stenographer, or a

clerk, for this purpose or may even deliver his message himself.

To be effective, a messenger service should make not less than three deliveries an hour throughout the office.

It is a common practice, also, to have deliveries made from department to department only, a practice equivalent to the delivery of the United States mail from town to town only, which compels each resident to call at the post office for his own mail. But if it is important to save the time of clerks going from department to department, certainly the same reasoning applies to saving them travel in their own department. The proper organization of a messenger service, therefore, necessitates travel from desk to desk, and that every desk from which papers are sent to another point in the office should be constituted and recognized as a pick-up and delivery station. Organized on this basis, it often saves a considerable amount of time, even in a very small office of but 15 or 20 clerks, to have one of the junior clerks, at 15- or 20-minute intervals, call from desk to desk and pick up or deliver papers, even if they are to be delivered but a few feet away. If the office manager will make the observation of clerks on their feet as described in Chap. XVI, he will discover a great amount of waste of this kind that can be prevented by an effective messenger service. And inasmuch as in the small office it will require but a few minutes to perform such a service, the junior clerk assigned to perform it can have other duties as well.

Where papers are to be delivered from department to department, vertical filing folders, or large 9 by 12 envelopes, can be used as containers, and can be used many times over.

Each station should be provided with "in" and "out" baskets or with a vertical stand containing several compartments. When a paper is ready to be sent forward it is placed in this container. If there are many communications for any particular station, a special compartment can be provided for that station, and the envelope, already addressed, placed alongside the papers, so that the messenger when picking them up can place them in the envelope for delivery.

Observe These Points Rigidly

A route should be planned, and the length of time required to cover it entirely should be known. In order that the messen-

gers shall not be overfatigued, a rest period approximating 25 per cent of the time should be provided. That is, assuming there are deliveries every 20 minutes, and it requires 15 minutes to cover the route, the other 5 minutes should be spent in rest, but the messenger should be required to remain seated at his station during this period, to ensure that he will be on hand to start on the next turn when the time comes. To make certain that the route is completely covered in the scheduled time, every messenger should be instructed to call at a station regularly, *whether there is anything to deliver or not.* If this rule is not enforced, stations which have a small amount of pick-up matter are likely to be neglected, the messenger concluding that it is useless to call at that station.

Instructions should be written out and thoroughly taught to the messengers. It should be understood by all concerned that messengers engaged in the internal mail service are not to be used for special errands outside the office, for, if this rule is not enforced, the messenger system will speedily become disorganized and ineffective. Until the habit of making the route on scheduled time becomes fixed, a card should be placed at several strategic points upon it, upon which the messenger will sign his name and note the time he called there on each trip. At the end of the day this card will be sent to the head messenger and be available for inspection by the office manager, who should look over it occasionally.

Proper delivery bags should be provided, containing several compartments so that the messenger can sort the mail as he collects it. Should the papers he collects be addressed to a station which he has not yet covered on the trip, he will deliver them on his arrival at that station; but if he has already passed that point, the papers will be delivered on the next trip.

The messengers should be distinctly impressed with the importance of the character of their work, which is the same in essence as that of a government mail carrier, for if it is not done with speed and accuracy, the work of the entire office will be delayed. This feeling of responsibility duly impressed upon the carriers will tend to make them more careful and faithful in the discharge of their duties.

With all this, no matter how carefully organized the messenger service may be, occasions will arise when special trips must be

made, and, while the office manager must recognize these possible emergencies, their use must not be abused by clerks and executives. An abnormal number of "rush" letters constitutes the most serious interference with the regular delivery of messages, and the conditions surrounding the making and handling of such rush messages should be studied and standardized, so that they can be reduced to the smallest number possible consistent with carrying on the work of the office.

Mechanical Devices for Delivering Messages

Many mechanical devices are now available for doing the work of carrying messages, and due consideration should be given to their possible use.

The pneumatic tube is a well-known device, and installations may be had which will carry either small or large tubes. This type of conveyer delivers messages very rapidly and, where there is a clear need for it, is exceedingly effective. The cost of its installation, however, is rather high.

The elevator is rarely considered as a means for delivering messages, though in offices with several floors it can be used to transport the messenger's delivery bag from floor to floor so each messenger route need cover no more than one floor, an arrangement which greatly reduces the labor of the route. There are also certain types of automatic conveyers which work on a vertical plane similar to elevators and travel from floor to floor, delivering papers automatically.

Extensive use is also made of the belt conveyer in carrying papers from one operation to another, and, when this device is equipped with brush-off stops at each station, it can be arranged to deliver automatically at specified points.

Carriers working upon wires and impelled by springs are useful for transmitting papers from one point to another. There are also carriers operated with a continuous running cable which are used for either horizontal or vertical delivery.

The telautograph is a device which is instantaneous in its operation. Simultaneously with its writing at the original point it writes a message at a point any distance away.

The teletypewriter is frequently used not only between departments in the same building, but also between buildings and between branch offices in different cities, either by private wire

or through a central teletypewriter exchange operated by the telephone company.

Before deciding upon any of the above-mentioned mechanical devices, every condition should be thoroughly analyzed and the device itself subjected to the strictest investigation to determine whether or not it is the best to adopt for the purpose.

Devices for Oral Communication

Beyond all doubt, the telephone is the most common and most useful form for oral intercommunication at a distance, though the ordinary speaking tube is still used in some places, being simple, cheap to construct, and involving no expense for upkeep. The use of extensions of the outside telephone with a private branch exchange is a most important form which is still not used to the extent its usefulness warrants.

The automatic telephone serves the same purpose as the extensions but gives instant service and eliminates telephone operators. Various types of interior automatic systems are in use, on some of which it is possible for several people to hold a conference over the telephone at one time, which is frequently a considerable advantage, for it saves much needless walking on the part of high-priced executives.

There are certain types of loud-speaking telephones with which a person may be called and may answer from any part of the office without going to a telephone instrument. The use of a device of this type, however, in an office where there are many clerks is not to be recommended.

For locating executives who may be, at the time, in any one of a dozen places in the building, there are various types of signals, bells, lights, buzzers, and so forth, operating on certain codes, which save much time in searching. The use of one of these devices makes it possible for an executive to go freely about the establishment, without worry as to whether or not he will receive important messages during his absence from his accustomed place; it saves the time of the telephone operator trying to locate him, and the time of every person who answers the telephone while she is trying one station and then another. The device will instantly locate him wherever he may be on the premises; it can be operated with various tone bells, buzzers,

or horns, or even flashing lights, and is equally suited to a very quiet office or a noisy factory.

The dictating machine, described in Chap. XII, may also be used effectively for the delivery of messages. If an executive wishes to give important instructions to some person who is not present at the moment, he can dictate the message into the machine, using as many words as he wishes. The cylinder can then be sent by the regular messenger to the desk of the person for whom it is intended; this person on his return can place the cylinder in his machine and listen to the message just as it was dictated, without the services of a typist.

Mechanical Aids to Messengers

Where a regular messenger service is in operation in an office covering considerable floor space, it is possible to expedite the service greatly by the aid of various mechanical devices.

In one such office where large quantities of papers must be delivered, a truck is used, a capacious four-wheeled conveyance with composition fiber wheels which render it noiseless in operation. It is pushed around from station to station, its roller bearings making this an easy task. Papers are sorted on the rack as the messenger goes around, and a burden many times heavier than an ordinary messenger could reasonably carry is easily transported to the points where needed.

In many offices with extra large floor space and great distances to cover, the messengers are provided with roller skates, the use of which makes travel much quicker and far less fatiguing. On still longer routes which must be covered quickly, some offices use a bicycle for that purpose.

Limitations of Mechanical Devices

It should be noted that in many particulars mechanical devices for carrying messages are strictly limited. Thus, they must always follow some established path, a fact which is at first not usually recognized as a drawback, but as soon as some change in the office arrangement is proposed, the difficulty is at once apparent, and it is recognized that a change may involve considerable expense. For this reason, many installations of mechanical devices have fallen into disuse. The remedy for this situation is not the abandonment of mechanical devices but

the careful consideration of their use beforehand and their establishment only in such paths as will not readily change. A device carrying messages from floor to floor will seldom have to be changed, for while the office occupies these floors the necessity for communication between them will remain. One which carries messages from one end of the room to the other, with stopping points on the way, will seldom require changing. But a device which runs from one definite point to another will either have to be changed at the very first alteration of arrangement, or the proposed change will itself be hampered by it.

Mechanical devices are also limited by the size of the package or the volume of messages to be delivered. When installed, this limitation may not have been anticipated, but, as the business expands or other uses are found for the device, it becomes a serious handicap. The remedy in this case is essentially the same as in most other problems. These conditions must be foreseen through a more careful study and analysis of the proposed installation, and especially its capacity in view of expected future growth.

Analyzing the Problem

Before any method for the improvement of intercommunication is adopted, the whole problem—not merely a part of it—should be thoroughly analyzed. The beginning of the study lies in some such questions as: Where are written messages best? Where are they least desirable? Where should oral messages be used? Only when the correct answers to these queries and others of similar fundamental nature have been worked out does the consideration of the various devices that may be used logically follow. The usual way is to think of a device and then try to use it.

When the various forms of the messages to be delivered, their urgency, quantity, and so forth, have been studied, the office manager should then—and only then—list all the possible means of accomplishing the work and consider them one by one as to their suitability.

The next step is to figure the cost of each method and compare results. All requirements must be known thoroughly, and the means (and cost of such means) for satisfying these requirements

must be weighed and compared. Only when the problem is analyzed in this manner can it be solved correctly.

Finding the Requirements

First, the number of stations where messages are to be sent or received should be known. Without this knowledge, no mechanical device can be effectively installed.

Second, the volume of traffic at each station should be estimated. This can be readily done, with approximate accuracy, by a study of the records of past performance. In addition, an allowance for expansion should be made, and this should be calculated, not merely guessed at.

The distances between stations should then be given consideration. The data compiled from this study will assist in the determination of the comparative value of various methods.

Another important factor is the speed required. A messenger walking 2 miles an hour proceeds at the rate of 175 feet a minute. Is this sufficiently fast? Is anything to be gained by delivering that message over such a distance in 1 second?

The frequency of messages that must be delivered is also a factor which determines whether a messenger system or a mechanical device is preferable.

The amount of space available is another consideration of importance, for frequently a mechanical device will occupy more room than can conveniently be spared.

Finally, the installation of certain mechanical devices to some extent detracts from the general appearance of the office, and this also is a factor for consideration.

Figuring the Cost

Comparative costs should be figured for each method under consideration, and more closely and accurately than is now the usual custom. Both the amortization and the running cost should be calculated as closely as possible.

Opening and Distributing the Mail

The organization and facilities set up for handling office intercommunications may also be used for expediting the distribution of the incoming mail, in order that no delays may ensue between the arrival of the mail and its prompt and adequate handling.

The opening of the mail should be so organized that, when the office opens for business, the first morning mail, or the bulk of it, will have been opened, sorted, and distributed to the desks of those who are to handle it, with all necessary previous correspondence attached to it. In fact, work should begin everywhere throughout the office *at the hour the office opens.*

Of course, it will not be possible for the clerks on the second step of a routine to begin work promptly on mail that is on the desk of the clerk working on the first step, but this difficulty can usually be overcome somewhat as follows:

Plans can be made for the performance of specific daily duties by each clerk at the opening hour, and such work should be not merely fill-in jobs that may be done at any time but tasks that will advance the routine of the work throughout. In almost every job there is a certain amount of preparatory work occupying a few minutes only, perhaps, but which nevertheless must be done. It will be necessary to make a study to determine tasks which can be done for the first 15 minutes or so at the opening of the day's work, which will directly advance that work; thus junior clerks can help in the distribution of the mail, while the more advanced clerks can work on the first few operations so as to get things well started.

Standard Method of Opening Mail

Where there is a large volume of mail to be opened, the following standard requirements and method should be adopted:

1. That work should be started on the mail well in advance of the opening of the office—a half an hour in some cases not being sufficient.
2. That the entire procedure of mail opening be studied and standardized according to scientific methods.
3. That all mail-opening clerks be trained to perform each operation at the standard rate of speed or better.
4. That the office manager have a rigid and complete plan, not only for the mail-opening routine, but also for getting the entire office started punctually on time, to avoid the usual waste of from 8 to 12 per cent of the day's work.

It should be remembered that time and energy are the controlling factors here, and every effort should be directed toward getting the mail opened, regardless of the number of people required.

A large crew, however, is not necessary, for a proficient mail-opening clerk, working with standardized methods, can open and sort 240 letters an hour—4 a minute. Neither is it necessary that all mail received on the first delivery be opened before the starting hour. It will do if enough is ready to start everyone working.

Sorting Envelopes before Opening

It is customary to make a preliminary sorting of the envelopes before they are opened, in order to avoid the expenditure of valuable time on unimportant mail, of which every office has a certain quantity, often very large. It is usually neither desirable nor important that advertising matter should be opened, sorted, and delivered in the quickest possible time. Such preliminary sorting can easily be done in most offices. Catalogues, pamphlets, and advertising matter, being usually in odd-sized packages and large envelopes, are easily recognized and almost sort themselves. As a rule they are delivered in a separate bundle by the postman. Again, letters with 1-cent stamps usually contain circulars, and these can be at once set aside, leaving for consideration only the first-class mail. Trained clerks soon learn to identify the different items in the first-class mail, from either postmarks, printed corner cards, colored envelopes, or specially printed return envelopes. They learn, for example, that certain envelopes are from suppliers and usually contain bills and statements, or that a distinctively colored envelope may indicate that the matter enclosed is intended for the credit department. They learn that letters in certain kinds of envelopes are from customers and contain either checks, orders, or important correspondence; these, of course, should be given preference in handling. Letters in reply to advertisements will often contain key numbers, which will serve to indicate their importance. This preliminary sorting having been made, the envelopes in the first-class mail are slitted on a mail-opening machine, which takes a very small slice off the top of each envelope.

Removing the Contents

A quick method of removing the enclosures is as follows: The clerk stacks a bunch of envelopes at his left, face down, open side toward him. As he lifts the top envelope by the edge,

the weight of the contents causes the envelope to open wider. The clerk inserts the thumb and forefinger of his right hand, removes the contents, arranges them neatly, and places them on top of the envelope, which his left hand has meanwhile laid down on the table in front of him, face up. With his right hand the clerk reaches for a pin, which is in a small glass oblong tray to his right, and pins together the enclosures and envelope. (Except to avoid mutilation of documents, clips should never be used to fasten papers together, since a clip is likely to pick up other papers, which may then be permanently lost.) The clerk places the pinned set on the table in front of him, somewhat farther back.

The letters can then be roughly sorted into a few divisions, orders being separated from correspondence, and cash mail from both. If the sorting is not difficult in this operation, it may be made final; if it is difficult, it can be continued as described below.

Some offices, where considerable cash mail is received and handled, have the opening clerk put all cash mail in a separate basket, and the cash in compartments provided for it, and as soon as a batch of mail is sorted— or, for that matter, at any time—the mail is recorded on a listing adding machine, the listing being done on a special sheet. This sheet may, if desired, be made in duplicate by inserting a carbon sheet. After listing the amounts and drawing the subtotals at the end of the sheets and the final total for all, the letters containing the cash are again handled, and the name—the address also if desired—written on the space provided. The list and the cash are then taken to the cashier, who gives his receipt, and the cash and the total items should agree. If checks, money orders, and other negotiable forms of paper are separated from the currency, and put on a separate sheet, this form—the original or duplicate—can then be used as a deposit slip, thus saving the cashier the trouble of making an additional listing.

Reading the Mail

Before reading the mail, many concerns stamp the time or date of receipt on the back of the letter. The object of reading the mail is to determine to which person or department a letter should be sent. In many cases a glance will indicate the proper destination. Sometimes the entire contents may have to be read. In

any case, the mail reader should understand that if the first reading of a letter does not indicate where it should go, he should lay it aside for attention later, or "throw" it to the office manager, instead of holding up the rest of the mail while he tries to figure out where one particular piece should go.

If a letter is in response to a previous letter, it may be necessary to get out the correspondence referred to, and in such cases it should be placed in a separate compartment and marked with the name of the person who is to get it, so that the file department can deliver directly when the correspondence needed is located. It should not, however, be made an invariable rule that all previous correspondence should accompany the letter, as this entails needless work on the part of the file department. It would be well to prepare definite rules as to the cases when the previous correspondence should be attached, for the guidance of the opener.

If correspondence is not attached in any case, then as soon as the correspondent gets the letter, he will either attempt to answer it from memory—which is a bad plan—or send for the previous correspondence, and in the latter case, action is delayed that might have been advanced. Attaching the correspondence gives the file clerks an early morning task, and the correspondents get busy on their real work in the early part of the day.

Distributing the First Mail

The most important, or strategic, points should be considered first, and the mail distributed to them as soon as possible. Frequent trips should be made to the file department, removing the contents of the special compartment reserved for this purpose, at frequent intervals, so that as soon as the file clerks arrive they can commence getting out the previous mail. Since it is not at all likely that they will do so without special instructions, that work should be planned as standard practice for them. Orders should be started to the order department with the least possible delay, and if necessary, delivered repeatedly. Furthermore, enough clerks should be provided in the order department to get the first operations into action quickly all along the line. Cash should be delivered to the cashier; if the cash-sheet plan is used, a sheet at a time can be delivered without interfering with the control.

It may be necessary, in case of a very large volume of mail, to supplement the first delivery by additional trips of junior clerks selected for this work.

The Office Manager's Control

It is advisable for the office manager to have daily reports made of the mail received, the amount of cash received, the time the first mail was completely delivered, the time the first order passed completely through the routine, and other similar information. These reports will, of course, have to be devised to suit local conditions, but their value is that through them it is thoroughly understood that work is to begin all over the office at opening time.

Outgoing Mail

All the time, effort, and energy consumed in getting the incoming mail opened and distributed early in the day may be of little avail if the ensuing outgoing letters are not handled expeditiously and to advantage.

Whether each department handles its own outgoing mail, or whether a central mailing department is set up for the purpose, is largely a question of volume and control. Even in small offices there are advantages in having all outgoing mail handled by one person or department. It is easier to control the use of stamps, the responsibility is definitely fixed, and a proficiency is acquired in handling the mailing operations which is foreign to the other clerical work. In many offices the outgoing mail is handled by the same staff that handles the incoming mail, with proper adjustments of the hours worked, of course.

The factors involved in outgoing mail are the collection, sorting, folding and enclosing, sealing and stamping, and mailing.

As fast as letters are signed they should be placed in the "out" basket. Many offices provide a stout manila envelope to protect the letters while en route to the mailing room. The messengers pick up the outgoing mail as they make their regular collections from station to station and deliver it to the mail room, where it is folded and enclosed, ready for sealing and stamping. If there are several letters for the same correspondent, as in the case of branches or jobbers or large customers, it is customary to place all mail for the same addressee in one envelope, thereby effecting a

considerable saving in postage and envelopes. For this purpose there may be provided special sorting racks containing stout manila envelopes already addressed.

For folding letters a bone or celluloid folder is best; creases can be made more neatly and with less fatigue to the operator than when creasing is done with the fingers. As each letter is folded, the address on it must be compared with that on the envelope. This work should be done as rapidly as possible, regardless of quantity, so as to develop the habit of speed and ability to handle a large quantity of mail on occasion.

Sealing and stamping are handled as described in the chapter on office machinery.

Mailing may comprise merely dropping letters down the mail chute in office buildings, putting them in the corner mail box, or taking them to the post office, depending upon the quantity and the time of day. Suffice it to say that letters should be mailed as early in the day as possible, and frequent trips should be made if necessary. Close cooperation with the local postal authorities, who are always ready and willing to help in any way they can, will help to assure that every advantage is taken of the post-office facilities.

Questions for Discussion

1. Give several instances in which inadequate or inefficient office service may influence the effectiveness of office workers.
2. Upon which is the effect of poor office service more costly, on the work or on the workers?
3. Why is it important to have the office staff depend upon the office services? Illustrate your answer by an example.
4. What is the simplest way to increase the output of an office worker? Do you believe it? Why or why not?
5. Why is intercommunication important in office work?
6. In how small an office is intercommunication a problem?
7. Regardless of the size of an office, should the subject of intercommunication be considered? Why or why not?
8. Why is the intercommunication problem pressing in a large office?
9. State and comment on three different forms which intercommunication takes in modern business.

10. What are the three main factors in the problem of intercommunication? Comment on each.

11. What are the two possible methods of solving the problem of transmitting written messages?

12. Why is the buzzer method of messenger service ineffective?

13. How can a messenger service be made effective?

14. How is a messenger route planned?

15. What is the minimum number of deliveries per hour that an internal mail service should provide? Why?

16. When would it be advisable to have more frequent deliveries than the minimum given in question 15?

17. Compare the advantages and disadvantages of making collections and deliveries from department to department, with the making of collections and deliveries within a department.

18. How may an office manager test the effectiveness of his internal mail service?

19. What equipment should be provided for the internal mail service?

20. Why should the messenger call at all stations regularly, whether there is anything to deliver or not?

21. How may this point be checked?

22. To what extent should provisions be made for special trips and rush messages?

23. When should an internal-mail messenger be taken off his route to deliver a special message? If your answer is "never," how should the "emergency" be handled?

24. List several mechanical devices which may be used for delivering messages, and comment briefly on each.

25. Describe three types of telephone systems used for interoffice communication, naming their advantages and disadvantages.

26. How may an executive be quickly located if he is in the building, but not in his office?

27. Describe the use of the dictating machine for interoffice communication.

28. Compare the relative advantages and disadvantages of the use of roller skates, bicycles, and pneumatic-tube systems, where there are great distances to be covered. Which would you recommend, and why?

29. What are the limitations of certain mechanical devices, and how may those limitations be avoided, or at least minimized?

30. What factors should be considered when contemplating the installation of mechanical communicating devices?

31. What are the two main objectives to be attained in the procedure of opening and distributing the morning mail?

32. What are the four requirements in establishing a standard method of opening the mail?

33. Why is it not necessary for all mail received in the first delivery to be opened before the starting hour? Is it desirable? Why or why not?

34. What kind of mail can be sorted before opening?

35. Describe the preliminary sorting of mail before it is opened, and state the purpose of this sorting.

36. Describe a quick method of removing the contents of a letter.

37. What is cash mail and how is it handled?

38. Should incoming mail be time-stamped? Why or why not?

39. What is the object of reading the mail?

40. What should the mail reader do with a letter that is not entirely clear after the first reading?

41. Should previous correspondence always be attached to incoming letters? Explain.

42. To what points in the office should mail be distributed first? Why?

43. What information about the daily mail should the office manager have as a control? What would he do with this information?

44. Why is the prompt and proper handling of outgoing mail important?

45. Describe the outgoing-mail routine.

Problem I

In the office of the Milady Soap Company there are 300 clerks. About 1,500 letters are received daily. The office opens at 9:00 A. M. At 7:30 A. M., 15 office boys assemble around a large table and, after one clerk has slit the envelopes on a mail-opening machine, proceed to open the letters rapidly. As they are opened, two other workers gather them up and sort into 30 baskets for later distribution. By 8:45 the letters are usually all opened, and the boys start delivering them to the various parts of the office,

so that by 9 o'clock, when the office opens, the morning mail is all on the desks.

How can this method be improved?

Problem II

The Wisconsin Mutual Liability Insurance Company, with 983 clerks, is about to build a home-office building and naturally wants to secure all the best intercommunicating devices available.

How would you go about making a traffic survey to determine just what is necessary and advisable?

VII

CORRESPONDENCE AND TRANSCRIBING

Two important problems confronting every office manager are how to get the necessary letters well written, and how to eliminate the unnecessary ones. The satisfactory solution of these two problems lies in organization and supervision. The requirements should be thoroughly analyzed, an organization set up to handle the work, and its operation supervised with care.

If all that is involved were merely the writing of routine letters by a centralized correspondence department, the difficulty of arriving at a satisfactory solution would be greatly simplified. Actually, so many persons in the office have occasion to send a written communication every now and then, if not regularly, that absolute control is probably out of the question, as well as absolute perfection, or anything near perfection. Nevertheless, there are possibilities which are well worth considering, since any improvement is better than none.

Correspondence may be external or internal. External is that between the company and those outside of the company. Internal is that between workers in the company, often called company correspondence, office correspondence, interoffice correspondence, intraoffice correspondence, or intracompany correspondence. Correspondence with branches is usually considered internal, since a branch is really a department of the business.

External Correspondence

Letters to those outside of the company may be written by the company's officers, by department heads and lesser executives, and by so-called correspondents, whose entire work is writing and answering letters. Others may also have occasion to write letters from time to time; proper and adequate organization and supervision will help to control the quantity and quality of such letters.

Two aspects present themselves: the organization of facilities, and the improvement of the quality of the letters written. Facilities include the provision of stenographers or dictating machines to take the dictation. The organization of facilities goes further than merely providing them; it comprises getting the letters to those who are to answer them, together with whatever information is necessary to answer each letter intelligently; it includes seeing that a stenographer or a dictating machine is available when the correspondent is ready to dictate; it requires that the dictated matter be transcribed promptly so that the signed letter may be mailed early in the day instead of the last thing at night. All of the above involve setting up a routine.

The Letter-writing Routine

The letter-writing routine starts at the mail desk with the opening of the morning mail, as explained in the preceding chapter. Its early start continues with the delivery to the correspondent's desk, before the office opens, of letters to be answered. Promptly at the opening hour a stenographer appears at the correspondent's desk, ready to take dictation; or, if dictating machines are used, the dictator finds his machine in running order, with a supply of cylinders at hand, so that he can start his dictation at once.

After dictation, the stenographer will transcribe her notes, or the dictated cylinders will be picked up by a messenger and delivered to a transcriber, who types what has been dictated. When the transcription is finished, a messenger brings the typed letters to the correspondent, who reads and signs them, then puts them in his "out" basket for collection and delivery to the mailing room, where they are folded, enclosed, sealed, stamped, and mailed.

Now these things do not just happen. Back of their effective functioning is the carefully laid out routine, together with the directions and scheduling by the office manager, supervised by him or by the four supervisors of the mail, file, correspondence, and transcribing divisions, if such divisions have been established.

If the procedures described in the preceding chapter have been followed, the letters are on the correspondent's desk when he arrives. But if there is no stenographer, or no clean cylinder,

he cannot start dictating. The provision of shaved cylinders is the joint responsibility of the messenger department and the correspondent. There should be at least three clean cylinders ahead of the correspondent at all times. As a messenger takes away dictated cylinders, he should observe the number of cylinders left in the dictator's rack and see that they are replenished. The dictator should also watch this point, and if he finds his supply of fresh cylinders is dwindling too rapidly, he simply drops a colored slip in his "out" basket, which notifies the messenger that more cylinders are needed. This slip is about 7 inches long and 1½ inches wide, of a distinctive color such as light blue. It has the correspondent's name or initials on it, and until it is used, it rests in one of the unused cylinders. Ordinarily it will seldom be used but is placed there as a safeguard. If it is used, the messenger who brings a fresh supply will leave another slip. In some offices a messenger checks all cylinder racks before the office opens.

When dictating machines are not used, the assigning of a stenographer is the responsibility of the head of the stenographic or transcribing division, or of the office manager if there is no such division. This assignment is a problem of scheduling, which is covered more adequately in a subsequent chapter. Arrangements are made by the office manager or the division head to have a designated stenographer at a designated correspondent's desk at a stated time each day. A substitute stenographer is also named to take the place of the regular one if she should be absent.

The head stenographer controls the assignment of her girls by a simple line chart which shows at all times where each girl is, whose dictation she is taking or transcribing, and how much work she has ahead. Assignments are made accordingly, so that the work is spread evenly among the members of the force.

Providing for Nonroutine Dictation

The described routine takes care of the regular correspondents. What about those whose letter writing is intermittent and irregular? How may their requirements be taken care of?

There are two ways of handling this problem. One, the easier, though not necessarily the better, is to have all requests for serv-

ice made to the head stenographer, who will assign the first available girl.

The other method is for the office manager to try to arrange with the individual for a definite time each day for dictating his correspondence, with the understanding, of course, that allowance will be made for interruptions and provision for emergency dictation at any time. If it is understood that "emergency" dictation is not the result of procrastination on the part of the individual, but something that cannot be foreseen, the office manager should have no difficulty in arranging a schedule if he allows for variability in human temperaments. After all, the occasions which require letter writing are relatively few—mail comes in, conversations are held, certain situations arise. The mail arrives at regular times, providing a basis for scheduling. The other two factors, if all concerned are reasonable, can readily be accommodated. Even though adaptation to a schedule may seem awkward and confining at the start, the formation of the habit of looking forward to a definite time for dictation each day will cause the earlier apparent restriction of freedom to fade into the background because of the resulting improved service. Since one of the important tasks of the office manager is to "sell" the other executives on his ideas for service improvement, this is a good place for him to start.

Much of the correspondence that is carried on in the office is unnecessary, and much of the remainder can be handled far more economically and at the same time more effectively than is now the case. While it is true that much writing and recording of interviews is necessary to good office management, it is equally true that much of it can be very well dispensed with.

As in all other problems, an analysis will show the factors. The purpose can be defined as the conveying of some necessary and specific thought or information from one person to another, either outside or inside the establishment. This can be done in various ways, such as by personal conversation, or over the telephone, or by the written word, in letters, memorandums, and telegrams. Again, the nature of the message to be delivered will largely determine the method to be used, and the words constituting the message itself will vary according to the person or persons to whom it is to be transmitted.

Standardizing the General Aims and Policies of the Company

When the general aims of the company, after careful study, have been standardized, this fact will aid greatly in increasing the effectiveness of the correspondence and interviewing work of the office, as it will to a large extent determine its character.

In the necessary communication between the office and those outside of it, if scientific methods of observation and testing results are introduced, it will invariably be found that many of the examples of correspondence so studied are not based upon sound reasoning and are not effective; that not only is there no uniformity in the manner in which these communications are transmitted, but the results obtained are rarely as satisfactory as they should and easily might be.

In this question of correspondence, one consideration that should never be lost sight of is that, in all communications between the company and the customer, the person who communicates from the office *is* the company, to that customer. What this individual says, the company says; he represents it; he personifies it; he *is* it. Therefore, when a company delegates this representation to an untrained correspondent, it must take the consequences, and they are often serious. Still more exasperating is the fact that the defect may pass unobserved for years, while the company fails to hold its customers and is ignorant of the reason why.

Yet few organizations make any consistent and sustained effort to train correspondents, nor do they even devise and adopt a correspondence manual in which the aims and policies of the company in connection with this matter are set forth. Most correspondents are self-taught, though some large offices conduct training classes in this activity, and some have correspondence counselors who visit the office periodically and criticize the letters written. But in every office it is easily possible for the company clearly to state its aims and policies in a manual, and the office manager can periodically examine the letters for departures from these policies.

It should be clearly understood that every letter that leaves the office affords an opportunity for building goodwill, but in a very large measure these opportunities are wasted.

A salesman writes the sales letters, but the complaint letters are often turned over to a correspondent who entirely lacks the sales "sense" of the other, and who has not the slightest perception that he may be nullifying his good sales work.

Letters to suppliers also afford similar opportunities for building goodwill, but few correspondents can forget for the moment to abandon the assumed prerogatives of the buyer and strive to make friends even of those who supply them with the merchandise they must have. To be well and favorably known as a buyer is exactly as valuable an asset to a company as to enjoy a similar reputation as a seller, though this simple fact, not being generally understood, is frequently overlooked.

Again, these opportunities exist within the office itself, for the goodwill of the employees is by no means a negligible matter in increasing its efficiency. Executives must interview employees at times, and the morale of an organization is always directly affected to a greater or lesser extent through these contacts.

Standardizing the Methods

A study of the outgoing mail of any large company made by an experienced observer might force upon him the conclusion that many of the dictators had one language for letter writing and another for speaking, the former seeming to be almost completely devoid of persuasive power. Hackneyed phrases, endlessly repeated, almost give color to the belief that the dictators have formed the habit of disposing of letters as if they were so many pieces of paper to be got rid of and utterly fail to realize that the recipient of each of these pieces of paper is a real, live human being, and perhaps a present or prospective customer.

It is a serious mistake to assume that real and effective salesmanship cannot be put into a routine letter, for it may be expressed in many ways, in a few extra words about the goods, a paragraph dealing with the service of the house, or a few sentences showing an interest in the customer's business; but efforts are rarely made along this line. Unfortunately in many cases, it would almost seem that the opposite effect is striven for. Thus, if a customer makes a claim or complaint, a common method of dealing with him in correspondence is to show him why he is wrong and the company is right and proceed to demonstrate that the damage, delay, or defect complained of should not, or

could not, or probably did not happen, and then end up by grudgingly granting the claim, a sort of treatment that certainly is not calculated to promote goodwill on the part of the customer. A much better way would be first cheerfully to allow the claim and afterward add any explanation that might be thought necessary. If a customer loses his temper and writes an abusive letter in consequence, the situation is made still worse by replying in kind; yet many correspondents do this.

The general style of letters should be standardized, for if each stenographer is permitted to choose her own style of arrangement, the individuality of the company is not expressed. Yet it is a valuable sales point that should not be overlooked, for the style of the correspondence of a company, in a certain sense, expresses the general character of the company, or in other words the company itself is associated in the minds of its customers with the form and style of correspondence they receive from it, and with which they have become familiar.

To achieve this expression of individuality of the firm in its correspondence, the letter should be standard in form from the date line to the signature. Such matters as the form of the opening salutation, the length of the lines, the paragraphing, the rules governing indentation, the complimentary close, and the manner of writing the signature of the company should be the same on all correspondence.

Many communications covering a specific subject can be form letters, but going to extremes in this matter should be guarded against. To send a form letter when a specially typed letter should be used is often the most mistaken economy. No specific rules, however, can be laid down on this matter, for it depends entirely on the character of the company and the kind of customer. Some of the large mail-order houses use form letters to an extent that a manufacturing company could not afford to, owing to the entirely different nature of their business.

Improvement of Style through Form Paragraphs

But in answering routine correspondence, the form paragraph is unquestionably superior to the form letter, and in practically every office there are innumerable subjects that require either identical or generally similar treatment, and on which identical or generally similar answers must be returned.

With such a system, the "personal touch" is easily possible of attainment, and such paragraphs, devised with some literary skill and sufficiently varied, need not bear even a trace of that formality and wearisome repetition so characteristic of much business correspondence. It must be remembered, too, that what is called the personal touch is not a matter of whether the communication is intended for one person or many, for a single acquaintance, or a number of strangers, or the public generally; it is, on the other hand, wholly a matter of style, a fact universally recognized—though perhaps not always consciously—in the works of the most successful writers. There is no reason whatever why well-constructed form paragraphs for business correspondence cannot achieve something of these qualities. The advantages of this method may be thus summarized and explained:

1. Better work can be done and better results achieved. It is a common characteristic of nearly all people to use similar words, phrases, and expressions in conversation and writing, and good writers and conversationalists take advantage of this well-known fact. They use familiar words and phrases, but these are always carefully selected, fitted, rounded, and polished until they become attractive and pleasing in form and style and at the same time produce the exact shade of meaning intended, thus creating the desired effect on their hearers or readers. Like all other human activities, this, when it becomes a habit, remains fixed and is apparently produced with little effort, as we can readily recognize in the statements of a skilled conversationalist as well as those of a writer. If, on the other hand, this is ignored, and the words and phrases are used carelessly, the statements made become dull, tedious, hackneyed, and unattractive, or to use a popular slang term, "bromidic." Now, it is obviously impossible for a person who is constantly dictating about the same subject to use different words each time, and the tendency therefore is unconsciously to adopt certain phrases which become stereotyped, and still more unfortunately there is an added tendency for the inferior style still further to deteriorate rather than improve. On the other hand, if a carefully constructed and extensive form-paragraph system is used for this purpose, sufficient thought can be brought to bear on each paragraph and its variants to create the desired effect, and letters so constructed

will possess both style and attractiveness, and considerable literary quality likewise, a result that is utterly impossible with the exclusive personal dictation above described.

2. More work can be done. Time and labor expended on the proper arrangement of words, sentences, and paragraphs, render it unnecessary to continue repeating them orally, and the mental energy saved by a properly constructed paragraph system can well be expended on other matters and on special cases that demand special attention.

3. The work itself becomes more interesting. The oral dictation of the same words over and over again becomes very monotonous to people with active brains, and they are the type of people who do this work. If they are freed from this wearisome repetition, and enabled to use their intellectual powers on the special work where special thinking is demanded, they will certainly find their tasks much more interesting.

4. Better control of the work is secured, and the constant apprehension of the dictator that he may have used faulty, inadequate, or imprudent statements in his dictation will disappear.

5. The standardization of the system will make it much easier to train new men in dictation work, when thus simplified.

6. The work of checking the copy will be greatly reduced.

7. The productive capacity of the typists will be largely increased.

The Construction of a Form-paragraph System

The construction of a scientific form-paragraph system involves the following essential requirements:

1. It should be originally written by someone doing the work which is covered by the system. It must be founded on actual cases, that is, the writer, in constructing each original paragraph, must bear in mind its actual application to a real condition, and with a real person, to whom it is addressed, in mind. Each paragraph should be gone over by a trained writer for any possible improvement in the diction, and, finally, by some person in the organization in a position superior to the original writer, to make certain that the paragraph carries the exact meaning that the organization desires to convey to those who have business relations with it.

2. No attempt should be made to have the system cover all possible conditions and situations. Begin with the most frequently used sentences or paragraphs and gradually extend the system. In its preparation it is well to go over the previous work done and select the paragraphs which seem to occur most frequently.

3. For paragraphs most frequently used, variants should be prepared, thus relieving the dictator of the necessity of constantly using the same one. In some of these cases it is advisable to write a considerable number of such variants.

4. No paragraph should contain more than one subject, and any variant of it should be handled in a similar manner to the original. Where conditions are even slightly different, special paragraphs should be used.

5. A full and comprehensive classification and indexing system should be prepared, using letters and numbers to indicate specific paragraphs.

6. The typists, as well as the dictator, should be supplied with the complete copies of the paragraphs, indexed and classified as above.

7. A standard form of indexing paragraphs should be devised.

8. Whenever necessary, individual oral dictation should be interspersed with standard paragraphs.

Internal Correspondence

As has already been stated, internal correspondence is that which takes place between the employees in the company. It has several names, but whatever it is called, it has certain features which should now be considered.

The purposes of these communications are to ask information, to give information and directions, or to make an explanation. An examination of the internal correspondence of almost any large concern will reveal the need for improvement.

One Cause of Excess Internal Correspondence

In the writing of both inter- and intradepartmental memorandums there is a widely prevalent practice of producing these things for the purpose of "going on record," a sort of defensive literature which usually makes its appearance in an office where the frequent reprimanding of clerks for errors is customary.

When a clerk or minor executive is thus rebuked for an error for which he does not consider himself responsible, he immediately makes a mental reservation not to be caught that way again and in future will go on record by writing a memorandum, instead of delivering his message orally. It is a most natural form of defense, and the fault lies not with him, but in the manner in which the responsible executive delivers the reprimand, for no human being can be expected meekly to submit to a public "calling down" and will naturally seek means to avoid it in the future.

STANDARDIZED MESSAGES ARE A SENSIBLE ECONOMY

There should also be a standardized method of writing interdepartmental memorandums. If it is assumed that they are

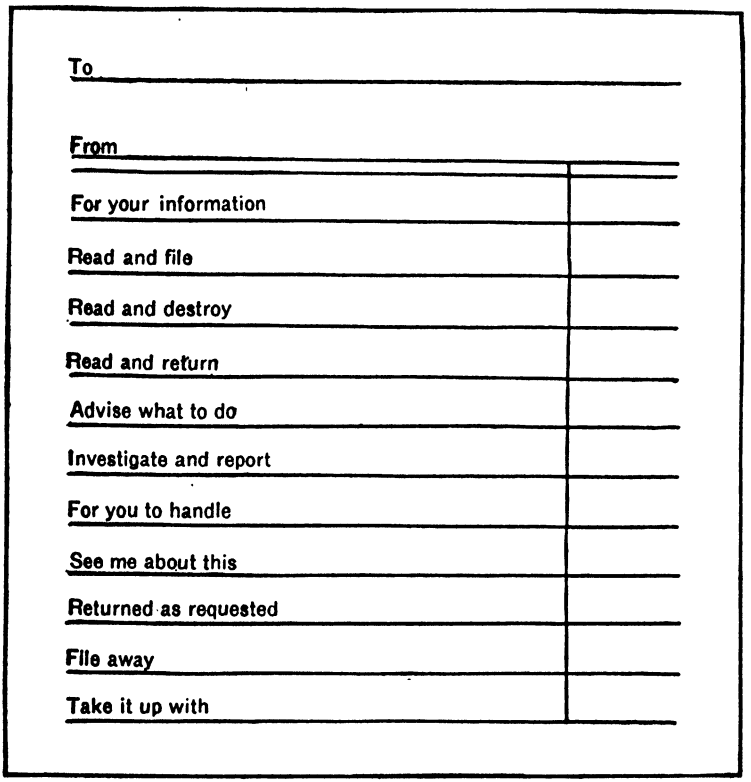


FIG. 5.—Interdepartmental memorandum.

necessary (and a great many of them are not), verbosity is perhaps their greatest defect, but this can be overcome by training;

in fact, by standardizing the message, all writing can frequently be eliminated. The circumstances under which these memorandums are to be used should first receive careful consideration and be restricted to definitely prescribed limits. Second, the form for writing them should be decided upon and also standardized. Use a half sheet, to suggest and promote brevity, and wherever possible use a list of standard phrases similar to that shown in Fig. 5. Write dates with figures only, as 12/15/43, and omit salutation and complimentary closing.

Instructions on Correspondence

Much interviewing between clerks and department heads can be avoided by (1) adequate instructions and (2) proper teaching and training of clerks regarding what such instructions cover.

Standard practice instructions governing correspondence within and without the office should cover all the main office routine, and instructions should also be devised for adequately expressing the company's policy and desires on special subjects which may not exactly be a part of such routine but which occur with sufficient frequency to require such instructions. Instructions should not be couched in cold, formal, impersonal language but should be vividly, yet clearly, presented and written in terms readily understood by the clerks. Since this accomplishment is not possessed by all department or section heads, the written instructions they devise should be edited and rewritten by the company "editor," some person who has demonstrated that he possesses this ability, and this again involves the standardization of the writing of instructions. It is also advisable, when writing instructions for the guidance of a group of clerks, to try them out in advance on one or two clerks whose average mentality is judged to be about that of the group to whom the instructions apply. If they show a full comprehension of what is meant, it is probable that the others will comprehend also.

The Chief Purposes of Corresponding and Interviewing

Since a thorough comprehension of the chief purposes of all communication in the office is indispensable, they may be here enumerated.

1. *Effective and Economical Communication.*—The first purpose is to communicate necessary thought in the most effective and economical manner.

2. *To Promote the Business.*—Every letter, memorandum, and document used for the communication of this necessary thought is assumed in one way or another to promote the business, but this, too, is one of the obvious things so often lost sight of.

General Rules and Comment

1. *Effect of Written and Spoken Word.*—The effect of the written and spoken word should be studied and taught by example and illustration in order that the desired result may be attained.

2. *Uniform Courtesy.*—Uniform courtesy in all communications, written or spoken, should be insisted upon. This is a matter that requires more than simple telling, and demands considerable explanation. Discourtesy in business communications is almost never intentional, but the careless use of words frequently gives that impression to the recipient. When a dictator states that "your letter is not clear" he may very innocently mean that it is not clear to him, but to the recipient it may appear as an insinuation that he cannot express himself clearly, and he will in such case certainly resent it. Such statements as "We are at a loss to understand why you," and so forth, or "What do you mean by stating that—?" and so forth, and similar phrases which may seem inoffensive to the dictator, may have a very different effect upon the recipient of the communication. In all these cases, it is quite possible to substitute expressions which, while they carry the same meaning, are perfectly courteous in tone and will not give offense to the most querulous correspondent.

3. *Striving for Clarity.*—The effective letter is always concise and clear. Needless verbiage, repetitions, and superfluous details add nothing to the clearness of a letter but, on the contrary, detract from it. Long sentences should be avoided in letter writing, and the simple words used in ordinary conversation are far more effective than the stereotyped phrases used in much of the so-called "business English."

4. *Striving for Brevity.*—It is quite possible to carry brevity to an extreme where it appears abrupt, churlish, and suggestive of discourtesy. But as a rule, when used judiciously, brevity, both

in conversation and in the writing of a letter, is a characteristic to be commended.

5. *Eliminating All Useless Correspondence and Interviewing.*—The importance of this needs no demonstration. If the office manager makes an examination of the correspondence work being turned out in the office he will be able to detect at once that which is useless. It will be more difficult to eliminate it, for merely telling the correspondents not to write useless letters, or clerks and executives not to indulge in useless interviews, will not suffice.

6. *Standardize the Methods.*—This, perhaps, is the most important rule of all.

The general style to be followed in all correspondence should be standardized. Most publishing houses possess what is known as a "style sheet," a very carefully devised document for use in the production of printed matter. This is an idea that should be adopted in every business office. The style sheet should give the company's preference in the spelling of words, when there are two methods equally correct, and the name of the dictionary to be used as a standard. It should also give general rules for spelling, punctuation, dividing words, the use of capitals, and so forth. The manner in which the company desires numerals to be used in the body of a letter should also be covered, and rules on abbreviations are also valuable. The following extract from the style sheet of a large office will show how this company standardized its methods of expression:

WORDS, EXPRESSIONS, AND STATEMENTS TO AVOID

Avoid a dictatorial style whenever possible—"must" and similar words will irritate many of your readers.

Avoid all forms of "elegant" expression, as well as the unjustified use of the inverted sentence, the superlative, and parenthetical remarks. Long words and made-to-order words are usually undesirable.

Think a bit about each word you habitually use and be sure it gives just the right shade of meaning. For instance, do not use "prevent" when you really mean "reduce."

Avoid the use of hanging participles and split infinitives.

Avoid excessive usage of "things," "such," "in regard to," and so on; do not use "up-to-date," "cater," "average man," or "average dealer."

Typewriting Transcription

The art of typewriting was one of the first office tasks to be taught in outside schools, and high schools, business schools, and similar institutions are annually turning out scores of thousands of "trained" typists.

The achievement of a high output does not involve driving the workers to the limit of their physical endurance, and those office managers who have proceeded on that assumption have invariably failed to produce the desired results. Just as in athletics, sports, or any of the arts or trades, good work, and a satisfactory amount of it, depends upon three conditions:

1. The elimination of all time-wasting motions.
2. The development of skill in the art.
3. The development of speed—assuming for this, of course, that the management has provided a steady flow of work, so that there will be no delays on that account.

In other words, the object of the effort made must be to develop good artisians, a result that is not attained by a short and rapid course of instruction, despite the tacit assumption to the contrary. The typist usually learns only by making mistakes and being disciplined for them, and she may—and often does—drift from one position to another, when the time could be shortened greatly by organized training.

Analyzing the Faults of Typists

Below are listed a number of time-wasting conditions, and suggestions for their elimination, and for general improvement. From these the investigator can make up a check list, adding thereto any other conditions observed.

1. Do the typists frequently make erasures? Errors must be corrected and their correction takes time—in some cases the time required to correct them exceeds the actual writing time. So if errors can be reduced, an immediate increase appears in the output. It is a well-known fact that the best operators make the fewest mistakes.

2. Is the posture of the operators correct? This calls for an erect body, with the back rested firmly against the chair and the feet squarely on the floor, for in any other position good work

cannot be done. To secure this correct posture requires constant attention and corrective exercises, together with the correct type of chair.

3. Is the physical adjustment of the operator, in connection with the position of the hands when writing, correct? The position used by the champion typists, which is undoubtedly the correct one, is to have the machine stand somewhat higher than is usual in the office at present. It should be so placed that the slope of the keyboard coincides with that of the forearms of the operator. The adjustment for persons of different sizes must therefore be obtained by the adjustment of the seat, inasmuch as adjustable typewriter tables are not commonly used.

4. Is the position of the copy—the notebook holder, the material being copied—correct? A notebook holder, or one of the devices placed at the back of the typewriter to support the copy, should be used. Twisting the head and neck, leaning over to one side or the other to read copy, and all similar motions are unnecessary and fatiguing and tend to reduce output.

5. Do the typists insert the sheets into the machine properly? A great difference can be noted between a trained and an untrained worker on this simple operation. In the correct method of insertion, the sheet is picked up with the left hand and placed squarely behind the platen and against the apron of the machine, and in this lies the main importance of performing the operation correctly; for if the paper is square with the platen it will naturally come through the machine in correct position, but, if not, it will sit crookedly on the platen, and its adjustment will necessitate further manipulation. When it has been properly placed behind the platen, the twirler knob is grasped by the right hand and given a sharp turn, and the sheet is rolled into the correct writing position. In this operation, the marginal guides should also be used, the paper being always placed against the left-hand gage before moving the twirler knob; this will avoid the necessity of adjustment each time to get the margins accurate.

6. Do the typists twirl the platen roller properly? This is an operation that may be performed leisurely, turning the roller one notch at a time and grasping the knob several times, or it can be done with one grasp and a quick turn, which will revolve the roller and turn the paper up the 10, 15, or 20 single-space lines

that may be required. The trained operator will appear to place the paper in the desired writing position with one motion.

7. Is the carriage thrown back properly? The untrained typist will leisurely push the carriage back at the end of a line, sometimes using both hands for that purpose. The trained operator strikes the carriage return lever a sharp, quick stroke, with just sufficient force to send it all the way back to the starting point of the new line. Either the left or right hand should be used according as one or the other is nearer the carriage arm, for different makes of machines carry it on different sides. When this motion is correctly performed, it not only returns the carriage but at the same time turns the platen roller into position for writing the next line; that is, one movement performs two operations simultaneously. The difference in the speed of performing this operation correctly and incorrectly may be two or three one-hundredths of a minute, and as it is done between 15 and 50 times on one letter, the saving of time is evident.

8. Do the typists indent paragraphs with the tabulator? Nearly all machines have a tabulator key and stops which may be adjusted at any desired position, and these should always be used for indenting paragraphs.

9. Do the typists remove the paper from the machine properly? At the end of a page, the paper should be thrown out quickly by turning the twirler knob with the left hand, while the right hand simultaneously grasps it and places it on its pile, face down; the left hand instantly takes a fresh sheet of paper or envelope from the pile close by, and places it behind the platen in the manner described in paragraph 5. An equally correct way is to remove the paper by a sharp pull with the right hand, while at the same time the left hand is engaged in getting the next sheet. The well-trained operator will remove one sheet of paper and insert another in one-quarter of the time required by the average untrained one.

10. Does the operator use the touch system? Even though learned in school, at least partially, not all operators use it consistently afterward. An operator may slip up on the following points:

a. Are the nails properly manicured? The proper method of striking the keys is with the tops of the fingers; if the nails are long, this cannot be done.

b. Are the keys struck with a firm, quick, accurate stroke, and then quickly removed? If not, there is a tendency to jam the keys by striking between two of them or by striking a second key before the first has returned to its place.

c. Is the rhythm good? This means a steady tapping, with an exact interval between taps, instead of irregular intervals of time between strokes. A properly trained operator will read the copy far enough ahead so that there need be no pause between words, and, though she may not seem to be striking the keys any more rapidly than the operator who reads a few words and types them, then reads a few more, and so on, her output will be much greater. The effective operator should keep the carriage of the machine in rapid and regular motion, and the only noticeable pauses should be at the end of each line, the tapping sound being continuous and regular from its beginning to its end—this is rhythm.

The Causes of Errors in Typewriting

Of the three usual causes of typewriting errors, the first is the incorrect touch, a defect which can be corrected by learning the touch system. The second is lack of concentration on the part of the operator, and this is a much larger subject and more difficult to correct. It is perhaps the cause of the greatest number of errors made in office typewriting work, and is chiefly due to:

1. Lack of interest in the work itself.
2. Some physical defect, such as bad eyesight.
3. Some disturbing element or condition existing in the surroundings.

Lack of interest in the work is a problem for both the employee and the management, and the latter should employ every known means to arouse and stimulate this interest, for making work interesting is essential to successful leadership.

Physical defects, especially optical defects, should be corrected if possible.

Disturbing conditions of many kinds exist. Such conditions may be introduced by poor lighting, by the room being either too hot or too cold, by poor ventilation—a fatigue-producing condition; there may be excessive noise; or the operator may be ill from causes unconnected with the work. But whatever the

condition may be, the management should, as far as lies within its power, make every effort to remove it.

Still another cause of errors, possibly not so productive as those mentioned above, is to be found in lack of proper training. The system for reading notes or copy may be defective; if the operator reads one or two words at a time she will develop the habit of getting the context wrong. Reading of copy should be in phrases, not in separate words. This also applies to listening to cylinder dictation, for it is impossible to understand the correct meaning of the spoken words by listening to one or two at a time; such habit tends to wrong punctuation and perhaps the insertion of the wrong word. Error in spelling is another and rather common defect in the work of typists. It is, or rather should be, purely a subconscious process in typewriting. As the word is read or heard the fingers must mechanically type the spelling, directed by the subconscious mind, for were the operator to spell out each word consciously letter by letter, errors would constantly develop.

Reading Quickly and Accurately

Though most people can read, not all can read accurately, and but a limited number can read quickly. A poor reader can read, with accuracy, not more than 60 or 70 words a minute, and with the added distraction of copying, this would materially slow down the work. A good reader should read aloud, and accurately, 200 words a minute, and an expert can read far faster than he can accurately pronounce the words. On subjects with which an expert is familiar he can sometimes read as fast as 600 words a minute. It is not necessary for a typist to be an expert reader of this sort, but the average operator should be able to read aloud and correctly at least 150 words a minute. The whole secret of rapid reading is to read in phrases; that is, the reader must group the phrases and simultaneously grasp their import while reading—his understanding, sight, and voice must operate simultaneously.

Questions for Discussion

1. What two correspondence problems confront every office manager? How may they be solved? Explain briefly.

2. What is the difference between internal and external correspondence?

3. Who may write letters to others outside the company?

4. What are the two aspects of external correspondence?

5. Describe the letter-writing routine.

6. What is back of an effective letter-writing routine?

7. How may a dictator be sure of always having clean cylinders on hand?

8. When dictating machines are not used, what provisions should be made for taking dictation? Who is responsible for making that provision?

9. What are the advantages and disadvantages of scheduling dictation?

10. Comment on the desirability and means of standardizing the general aims and policies of the company.

11. Why should the general style of letter setup be standardized? How may this be done effectively?

12. When should form letters and paragraphs be used?

13. What are the advantages and disadvantages of form letters and form paragraphs?

14. Describe the construction of a form-paragraph system, mentioning all the points to be observed.

15. What is the purpose of internal correspondence?

16. Comment on the writing of internal memorandums for the purpose of "going on record." What situation does such a practice connote?

17. How may the writing of interdepartmental memorandums be standardized?

18. What is the purpose of the interdepartmental memorandum shown in Fig. 5?

19. How may excessive conferences between clerks and department heads be avoided?

20. What should standard-practice instructions regarding correspondence cover? Why?

21. Six suggestions are offered for improving the quality of correspondence. Name and comment on each.

22. What is a "style sheet," and what is its purpose?

23. "The achievement of a high output does not involve driving the workers to the limit of their physical endurance." Comment on this statement.

24. What are the 10 faults of typists which may waste time? Suggest methods of eliminating these faults.

25. What are the three usual causes of typewriting errors? How may they be corrected?

Problem I

One of the defects found in the office of the Indiana Manufacturing Company is the inadequacy of the intercommunication. Most of the information seekers ask for it orally and are answered in the same way. In other cases, memorandums are scribbled on scrap paper and pinned to the order or correspondence.

The form in Fig. 5 will not do. Design one on similar lines that will serve the purpose better than oral communication, and state your reasons for thinking that it will.

Problem II

In the typing section of the Parker Company there are 24 operators, consisting of 5 stenographers, 7 phonograph transcribers, and 12 typists on form letters.

There has been much complaint from executives and department managers that the work is very poor and many errors are discovered. It is proposed to make a thoroughgoing analysis of the situation.

What are the points to be covered? Make a skeleton form of analysis.

VIII

OFFICE RECORDS AND FILING

Altogether aside from the direct and specific principles upon which accounting is based, there are certain fundamental principles that govern successful record keeping of every kind.

1. *The purpose for which the record is kept must be justifiable.* The mere recording of facts that some day may perhaps be of value is not a procedure sufficiently definite to be accounted good business. If the records of an office are examined one by one with this principle as criterion, it will be often found that there are many which seem to have no justifiable purpose.

2. *Records must be capable of verification.* Unless this is possible, they fall into the category of "hearsay evidence" in the courts, of little real value in making a wise decision.

3. *They must be classified, to be of use.* If the facts of a business are recorded chronologically, and not afterward classified, their very bulk makes analysis difficult if not impossible. Classification of facts of any kind is in itself a form of analysis or may be considered a part of an extended analytic process.

4. *The information desired must be available when needed,* since the purpose for which records are kept is to furnish a specific type of information. It is not necessary that all this information should be *instantly* available at all times, as some executives have insisted, for this depends upon the type of information. If it is such that it is frequently used and liable to be called for at any moment, the records which contain it should be kept in such shape that the information is always ready to hand and can be had in the shortest possible period of time. If, however, certain other information is needed only monthly or at some other definite period, it is not economical to so design the system that the record is instantly available, for that is clearly not necessary. The purpose of the record should govern the character and degree of its availability.

5. *Records must be produced at minimum cost.* The truth of this statement will be perfectly obvious. Some managers make a fetish of records of facts and figures—entirely ignoring the cost of their collection—and justify their action by insisting that "it is impossible to run a business without facts and figures"—a statement which is true perhaps from one point of view but is the crudest of sophistries from another, or, as the logicians say, a "faulty syllogism." It implies that because facts and figures are needed to run a business, therefore *all* kinds of facts and figures are needed to run it, and you cannot possibly have too many of them. Some records being more valuable than others, the company can afford to pay a greater sum for their preparation, but that record will be none the less valuable if the same information can be procured at half the expense, while the profit would be increased by the difference.

Purposes of Records

There are four chief purposes of records:

1. *To Keep Orderly Account of Progress.*—The purpose of writing down and preserving memorandums of transactions, financial and other kinds, is to record the progress of the business, and this may be regarded as the historical function of records. In these documents, the story, or history, of the business is recounted.

2. *To Make Possible the Preparation of a Statement of True Conditions.*—Without these records of transactions that have actually taken place—records of progress—it is not possible to know the true condition of the business at any one time, and as this knowledge is of vital importance, all records should be so prepared that information showing the existing state of affairs can be taken off at any time.

3. *That Comparisons May Be Made.*—Thus, one period of time, one line of merchandise, or other similar things can be compared one with another through the medium of records. This may be designated as their analytical function and is becoming of increasing importance as business men progressively recognize the value of analysis. Some companies keep a running record comparing their business with records of general or specific business conditions, in order that they may know whether the fluctuations in their sales are caused by such conditions or by some condition within their own organization.

4. *That Wastes and Errors May Be Detected.*—To prepare records so that errors may be detected involves control figures of some sort, and these are usually provided by any well-designed bookkeeping system. For the detection of waste, a control figure, such as standard unit costs for any one item under consideration, is also necessary.

Records Will Not Promote Business

Valuable as records are, they will not, of themselves, promote business. They are, strictly speaking, tools for the purpose of facilitating or limiting some main function. If these tools are not put to use, if they are allowed to remain idle, they are but a useless expense, with the additional disadvantage that, unlike the tools of the mechanic, they are a constant expense for maintenance whether used or not.

Oversystematizing a business in the keeping of records is easily possible and by no means infrequent.

The adoption of records of doubtful value, or which are not used at all, does not come about because either the office manager or the general management intentionally desire to waste the profits of the business on record keeping. Its chief cause in every case is the apparent lack of ability for constructive, purposeful thinking on the part of those in the organization responsible for this useless work, a deficiency which seems to make it necessary to copy the record practices of other offices.

Records Should Be Designed to Order

While it may be considered axiomatic that all businesses are basically alike, there is nevertheless considerable truth in the oft-ridiculed assertion that "my business is different." Businesses differ first with the general or special character of the industry, second, in relation to the conditions under which they are conducted, and finally, as to personnel. With these variables, it is practically impossible to find any two companies that are precisely alike in all respects, just as, although all human beings are constructed on the same general physical plan, no two will be found exactly alike in all physical characteristics. The thoughtful office manager will, therefore, first strive to master the basic principles which govern all business, and then the particular conditions under which his own office works, and, guided by this combined knowledge, he will prepare or revise records accord-

ingly. There can be no universal system of records applicable to all businesses, any more than a suit of clothes can be designed which will fit all customers. It is folly to copy a system of records from some other company, though one may occasionally chance upon a good idea and adapt it to suit local conditions. The continual imitation or appropriation of the brainwork of others, however, usually results in nothing better than patchwork; the best system is one which is constructively designed to fulfill each of the four purposes previously enumerated and to suit exactly the conditions of the particular industry, the particular conditions of the business, and the personnel which is to use the system. Although devising such a system may take longer than copying that of another company, the results will be more satisfactory and less expensive in the long run.

Modern Tendencies in Record Making

The first notable tendency of modern business was to abandon the bound-book record and adopt the loose-leaf or card record in its stead.

The second notable tendency is to avoid copying of all kinds, by use of one or other of the many duplicating methods which will be described in a subsequent chapter.

Third, there is an increasing tendency for office managers to study the possibilities of reducing labor by minimizing the amount of work necessary to produce any particular record. Every motion eliminated naturally reduces the amount of time required; standard abbreviations are used, and standard descriptions printed so they may be checked, thus avoiding writing the entire description. All such tendencies clearly indicate a desire to minimize the amount of work required on any particular record.

Fourth, the actual necessity of each record is being questioned and investigated, and, where it is found that one is not being used and there appears no necessity for it, it is discontinued.

Fifth, much useless copying is avoided by classifying and filing. Thus, by filing all invoices made out to customers, numerically and chronologically, the necessity for a sales journal is avoided.

Sixth, record keeping is being coordinated, so that one record may serve several useful purposes, instead of having many isolated records which do not tie up with the general books.

Rules for Analyzing Record Keeping

All records should be examined analytically for the qualifications, and in the sequence, outlined below:

1. Are the records necessary? Do they accomplish the purpose desired? Is that purpose justified?
2. Are the records used? The fact that a record is not used does not necessarily mean that it is useless. It may be an indication that its value is not appreciated, and it may, of course, also mean that it is actually useless.
3. Are the records made so as to avoid unnecessary writings? In this connection it should be remembered that abbreviations reduce labor, and that there are many forms of abbreviating or symbolizing.
4. Is unnecessary copying avoided? This may involve copying either the whole of a record or part of it.
5. Are the forms used the best for the purpose? In a subsequent chapter this matter will be adequately dealt with.
6. Is the equipment—the binder, cabinet, or desk—the best for the purpose?
7. Are the tools used the best for the purpose?
8. Can the record under consideration be coordinated or combined with another already in existence?

What Accounting Must Do

Accounting must concern and record the progress of the business in its entirety. It must not only tell us *whether* we made or lost money—which is a purely historical statement—but it should also tell us *why;* that is, it should be analytical.

Other Business Records

In addition to the bookkeeping records of financial operations, other records are to be found in every office which, while they deal with values, cover the movement of those within the organization rather than the exchange of values between the office and those outside of it.

Such, for example, are purchase records. In addition to those records which exhibit the purchase as an exchange of values and which are kept in the bookkeeping department, there are, in addition, records of quotations, of the performance of

materials purchased, and records of similar character, which do not in themselves denote actual exchanges of values. A list of suppliers may be either a directory or a current record, and, in the latter case, the purchasing agent would not only record the names and addresses of the companies supplying certain materials but also what was purchased from them and what the report was as to its behavior during use.

Stock records are sometimes kept in the purchasing department, and sometimes elsewhere. They can either constitute one of the most valuable methods of controlling the capital invested in merchandise, or become a more or less useless and misleading compilation of items.

Sales records are kept for both accounting and sales analysis comparisons. Record of sales by territories is the most common practice, but some companies keep them by commodities also. If such records are fully utilized, they are of great value, but frequently much information is kept that is not used.

Production and cost records are also necessary in many offices but are usually poorly kept, and much of the information gathered and recorded in them is never used.

Personnel Records

Adequate personnel records are often absent, though they are exceedingly valuable. A company employing 200 persons will usually have an annual pay roll amounting to over a quarter of a million dollars, an expenditure which really represents the purchase of that much labor.

If records of the performance of each employee are properly made and used, they are of great value. Such a record should contain a monthly compilation of the number of times absent and tardy in arrival; positions held, promotions, salary increases, and other similar information; and if efficiency figures are kept on the quantity and quality of the work performed, these too should be included in this record. A collection of such cards would show a chronological history of the performance of the employee while with the company and would prove of great value in deciding such matters as granting increase of salary or making promotions. Without such records, the management simply makes a guess in the dark, as to whether or not it is getting its money's worth from the pay-roll expenditure. With

them, it can deal with each case on its merits and with justice to all concerned.

Records of labor turnover are also important and should be so kept as to show causes for leaving. The management may thus detect any particular cause which repeats itself frequently, for this will in many cases be significant of some defect in the organization or in the working conditions. The requirements of the Social Security Act and the wage and hour laws have made imperative the keeping of precise and detailed personnel records.

Filing as a Form of Record Keeping

It may at first strike the reader as curious that filing should be listed as a form of record keeping, yet a little reflection will show that filing a letter or document is equivalent to making a record of its contents, and very much cheaper. Documents are filed in order that they may be available for use at some future date, and this is also the precise purpose of making records. Classification of papers is a form of filing with the object of getting all material of one class together.

Classification

As before stated, classification may be considered either as a form of analysis in itself, or may form part of an extended analysis, as the case may be. There are two principal methods of classification used in books of record: (1) according to time, or chronologically, and (2) according to subject.

1. Chronological classification, though possibly the oldest form, has a definite, though strictly limited, application in modern business. As a basis for verification, it has a definite legal and commercial value, but for the purpose of analysis it has little or no value, especially if the volume of records is large. But when combined with subject classification, its value is greatly enhanced.

2. Classification according to subject furnishes the real basis for analysis, by bringing together in one place all the information available on any particular question, thus obviating waste of time in extended search.

The Function of Filing

Filing provides a means of preserving detailed records of business transactions; this was originally, and still is, its chief use.

To accomplish this purpose, the filing department requires, first, well-educated and well-trained supervision.

The second requirement is that the methods shall be thoroughly standardized and maintained in that condition; that no succeeding file clerk be permitted to design new methods or alter those which have been established and standardized, and that this standardization should be based upon the selection of a carefully considered and scientifically correct system.

Good training of the filing force is the final consideration. Accuracy should be especially stressed, as a letter misfiled is permanently mislaid and may entail consequences far more serious than the wasted time consumed in locating it. Therefore, no clerk should be permitted to file any material until he has thoroughly mastered the filing system.

These three requirements constitute the main factors in all office management, but they are of particular application in filing because of the extreme difficulty of correcting errors and the serious consequence that may ensue to the business if the filing work is not properly and expeditiously handled.

Central Filing

Unless there is a central file system, it is not possible to reap the full benefit of the advantages mentioned. Department files will receive indifferent attention, for the amount of material filed there is not usually sufficient to require the full time of one clerk, and in such case the work is attended to by a miscellaneous assortment of untrained clerks. In addition, decentralized files increase the expense of obtaining the needed information features. There is no question of the desirability of central filing departments for even very large offices, with hundreds of clerks scattered over a considerable area. The saving of labor alone is an item well worthy of consideration, and in such cases the delay to the work is not serious if the department is well organized.

The first step in the organization of a central filing department is to make a careful canvass of all desks in the office for the purpose of determining, from their contents, just what material there is to be filed, and what information each desk occupant requires from the central file. The canvass, which may be in questionnaire form, should cover every paper, record, or report made, handled, or kept in the office.

Records which are constantly referred to in the department in which they are made, such as purchase requisitions and copies of purchase orders or paid vouchers in the accounting department, should remain there, as no good purpose is served in centralizing them.

When the questionnaires are correctly tabulated and classified, information will be available which not only will determine what records are to be centrally filed but will also indicate, to a considerable extent, what method of filing should be used.

Desk-drawer Files

In making this survey, it will also be discovered that there are a certain number of files in the drawers of desks. It is a debatable question whether individuals should be permitted to retain files for their private use, because there are certain conditions where such practice is advisable, and others where the reverse is true.

Drawer files may be used where there are individual records or reports frequently referred to, though there is no particular reason why they should be so used. The practice is allowable where there are papers which are particular to the job, and which have no relation to any other part of the work of the organization. For example, the standards division might have a number of investigations under way, and the papers belonging thereto should be classified and filed, and as they are frequently referred to by an individual, may be filed in a desk file.

Executives may be reluctant to give up certain private papers in their possession, but, if a special confidential file cabinet with a lock is provided in the file room, these matters can be handled there.

Under the conditions above recited, drawer files may be permitted, but even in these cases the papers would be much better handled by a competent, well-organized central filing department.

Drawer files of a private nature should, however, not be taken away from individuals unless the filing department is well organized and can render equal or better service than the individual now has in handling them.

Executives or other individuals should not, however, be permitted to keep in their desk-drawer files papers which are commonly used by others, as this practice will neutralize the central filing plan.

Transferring Methods

It is inadvisable, and as a matter of fact impracticable, to keep correspondence files indefinitely, for the contents in some cases accumulate so rapidly that the physical space soon becomes exhausted.

It is necessary, therefore, to establish two policies:

1. How long is it necessary to keep the correspondence?
2. How long should it be kept in the active files?

The first will depend upon the length of its possible activity and the statute of limitations, and the second upon its period of greatest activity.

There are two systems of transferring files: (1) the periodic and (2) the continuous.

The periodic system consists of transferring material in the filing folders from the "live" to the "dead" at regular periods, mostly annually, though the date of this transfer can be set at any time. Some firms place it at a date just before the opening of a new season, if their business is subject to great seasonal fluctuations. In the operation, the folders are transferred just as they stand, but the guides are allowed to remain. In some cases, where there is sufficient equipment, the two bottom drawers are used for the transferred material, and the two top drawers for the active files.

The continuous method provides that a definite time be set—say, one year—in which papers are permitted to stay in the active file. The date of the first letter placed in a folder is then put on the folder label, and the file clerk is allowed a period of grace—perhaps from three to six months—to make the transfer. From time to time the clerk makes transfer of all folders in the file on which the date marked is for the maximum period. The contents are examined, all letters within the minimum period are returned to the active file in a new folder, and the pieces in the old folder are filed. In files where there is much correspondence relating to some particular job, say, of construction, the open and completed method of transfer can be used; that is, all completed jobs are transferred on completion, and all open jobs allowed to remain in the files until they are completed.

If a folder becomes crowded before the transfer period, it should not be transferred, but the contents should be divided into other folders.

Destroying Old Matter

It is unprofitable to retain old records which have no further value, but few managers have the courage to destroy such matter, as they believe there may be possibly a few very valuable papers hidden amongst the obsolete ones. This fear may be well founded, for such executives often do not know what and where the valuable ones are, and they dread the task of searching the haystack to find the needle.

This doubtful and vexatious question or condition may be permanently disposed of by thoroughly standardizing the policies in connection with it. Certain pieces of the material in the files should be kept indefinitely. It should be positively determined what kind of material this is. Certain other kinds should be kept for periods of, say, five or ten years, and the remainder can be destroyed almost any time after the expiration of one year. What these divisions will be, must of course be decided by each individual company, according to its needs, but the determination should be carefully made, the material minutely and accurately defined, and the standard adopted should be rigidly maintained.

Central Tickler File

This is merely a series of guides for the months of the year and folders for the days of the month. Into this file in chronological order are placed follow-up letter copies, appointments, due dates, or other matter which should come up automatically on the day set. This file is searched daily, the first routine operation in the morning being the delivery of the material indicated by the file to the proper persons. Executives, if they wish, may keep their own ticklers, but the central file, run as a routine operation, is more reliable. All kinds of memorandums wanted at a future date can be placed in this file, and the more general its use throughout the office, the more reliable it will prove. Private matters may be placed in sealed envelopes bearing the notation, "Bring up on.....(date)" and signed by the person who is to receive it.

Controlling the Work of the File Department

The office manager should require regular reports from the file department or departments as to the number of pieces received for filing and the number of requests for material to be withdrawn from the files, and this record should be kept daily and reported weekly. It requires little labor but furnishes a good index to a good many other features of office management, besides the work of the file department itself.

A regular routine inspection plan should also be put in operation. It cannot be done by merely glancing at a file drawer now and then, and it is at the same time unnecessary to make a complete examination of the entire filing section. It should consist, however, of a complete study of a small section of the work of each filing clerk selected at random. It should cover the accuracy of the filing, the thoroughness of the cross indexing—where that is necessary—the neatness of the folders and the correct position of folders and guides. The preparatory work, such as indexing, should also be checked by holding back for examination a section of the work before it is filed. Attention to these points will give the office manager an effective control of the filing work.

Filing Equipment

As previously observed, filing is in effect the same as record keeping. By filing a piece of paper which may contain information of future value, we merely avoid the necessity of briefing, or copying it at length; at the same time many of these documents would lose their chief value as legal evidence if they were copied and the originals destroyed, and for this reason they are always preserved. But they must be stored, and this storage must be arranged in a systematic manner so they can at once be located when wanted. This additional purpose of storage may include many other things besides records.

Vertical filing is a subject of so great and peculiar importance that its full value is hardly realized by the younger generation of office workers. Our fathers and grandfathers did most of their filing in pigeonholes, in tin boxes, in desk drawers, and on shelves, and a systematic business man in those days was a rarity. The introduction of the vertical file marked the utilization of a great

efficiency principle, namely, that there is almost always more room for growth in a vertical than in a horizontal direction. When we use the surface only, a much greater area must be covered than when we use the third dimension, height.

Requirements of Good Filing Equipment

The first requirement of any filing equipment is that it should be fully adequate for the purpose for which it is to be used; that is, it should be the right kind and there should be enough of it. This necessity is so palpably obvious that it seems almost a truism, but it is exceedingly common to find filing equipment that falls far short of this requirement. Overcrowded file drawers—a common sight—increase the labor of filing four or five times, yet some office managers apparently consider it economy to utilize the last available inch of space and compel the file clerks to push each letter into place by main force.

Second, the method of filing should be simple to use.

Third, the use of the equipment should not entail laborious work; that is, no more energy should be expended upon it than is absolutely necessary. The use of plain wooden boxes on shelves is still considered economical in some offices, and many buy the cheaper transfer cases rather than spend money for a cabinet that works smoothly and easily.

Fourth, sufficient equipment of the proper sort should be provided, so as to make it easy to refer to transferred material.

Fifth, the equipment should be of a quality that will last and give perfect service for a period in excess of 20 years, with ordinary constant use. Most modern filing equipment satisfies this condition.

Sixth, it should be economical in its use of space.

Uses for Filing Cabinets

The most frequent use for filing cabinets is naturally the keeping of correspondence, but there are many other things which can be systematically stored in them, to considerable advantage.

Invoices, for example, are very easily kept in a systematic manner by the use of a special cabinet, which can be had as regular stock from any maker of filing equipment. These cabinets are designed to fit the standard invoice form, which is about 8½ inches wide by 7, 11, or 14 inches long.

Special check files are also made for banks and other large users of checks, and cabinets are also made for ledger sheets.

Catalogues are readily stored in filing cabinets, though there is unfortunately no standard size of catalogue. Some concerns use bookcases. Others use a special cabinet with shelves and partitions adjustable to the various sizes of catalogues.

The use of a filing cabinet for the storage of stationery is as yet unusual, but, where there are large numbers of forms of 8½ by 11 inches or smaller, great economy in space can be secured by such use. For such storage, folders are not necessary, but heavy pressboard guides should be provided, and the follow block should be compressed.

An interesting development in filing, practiced by life insurance companies, is the use of open shelves instead of cabinets for their central files. Since the policy number is the key to the insurance company's records, the files are on a numerical basis, with one folder for each policy number.

Principles Governing the Use of Visible and Nonvisible Systems

The makers of visible systems are very active in pushing the sale of their products, and the office manager is often at a loss to determine just where the visible system will prove better than the nonvisible.

First, it must be noted that the physical requirement of overlapping cards in the visible system requires more space than the same number of cards properly guided in a drawer. But this may or may not be an important element.

Second, visible equipment costs more than nonvisible. This also may or may not be important.

All card work consists of the following cycle of unit operations:

1. Locate card.
2. Read information.
   - *a.* In some kinds of work it is necessary only to read the information.
   - *b.* In other kinds, it is necessary to first read and then withdraw card.
   - *c.* In some kinds of visible systems it is not necessary to withdraw the card.
3. Withdraw card or tray of visible records.
4. Make notation on card—sometimes omitted as stated in 2*a*.
5. Return card to tray.

Time studies have shown that it is possible to locate cards (operation one) by the visible system in about one-fourth the time necessary for the nonvisible, but this factor also depends upon the space covered by the complete number of cards operated upon by one person.

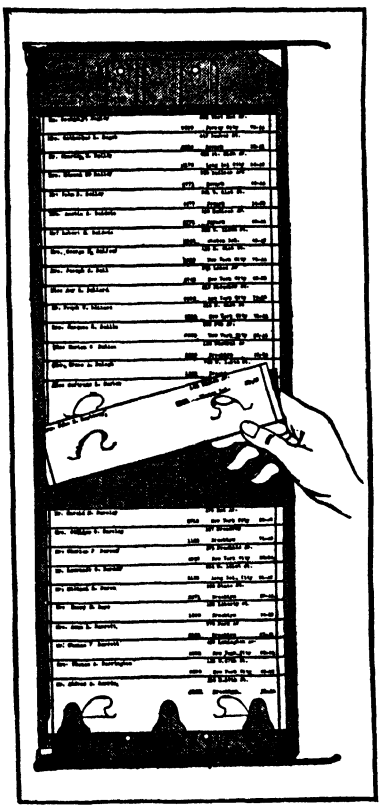


FIG. 6.—Index Visible rack and cards.

It requires just as much time to make a notation on a visible record card (and sometimes longer on account of its awkward position for writing) as it does on the nonvisible-system card.

The solution of the problem, therefore, depends upon not the relative time required for one unit, but that required for all of the units in the operation, and this in turn depends upon the number of cards that can be handled by one person, or the activity of the cards. For example, if the list contains 50,000

cards, on which there are but 500 entries to be made in one day, and 500 entries constitute a day's work for one person, it is obvious that these cards should be placed in such a position that they could be handled by one person. If, however, there were

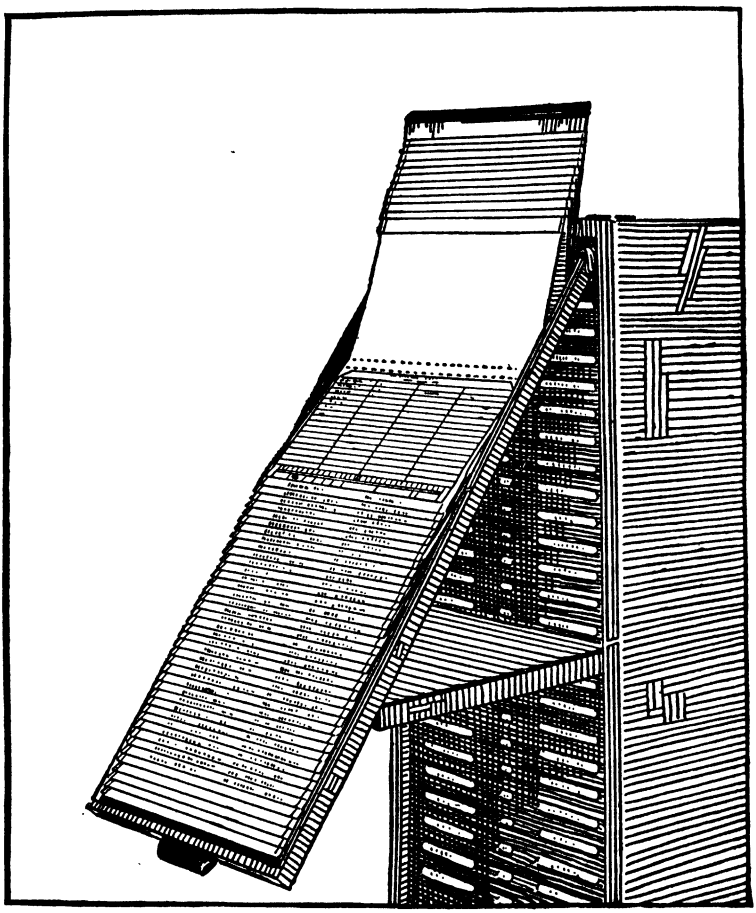


FIG. 7.—Visible index cabinet, tray, and cards.

1,000 entries to be made in a day, and conditions remained the same, the list would have to be divided between two persons. But if, on account of the space to be covered, one person could not normally handle 500 entries on the visible system, no matter how quickly the names could be located when the clerk was on the spot, the visible system would require more labor.

Therefore, in making his decision regarding which type of system to employ, it is necessary that the office manager should get the following facts:

1. How many entries are to be made in a day?
2. How many cards or names in the entire list?
3. How much space will be required with each system?
4. How many names will be easily accessible to one person?
5. What is the complete operation time per entry with each system?
6. What is the cost of equipment in each system?
7. What is the cost of supplies in each system?
8. What is the cost of labor with each system?

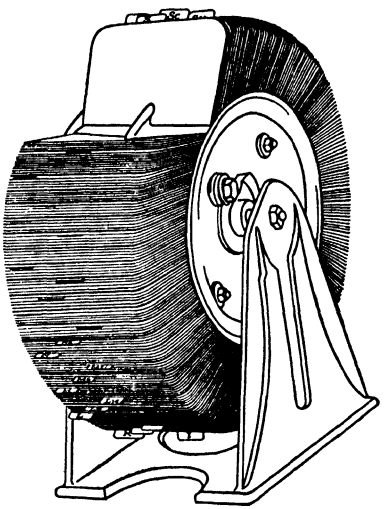


FIG. 8.—This desk model of a wheel-like index holds 2,400 3 by 5 cards for instant reference.

Armed with this information he can easily make his decision, independent of the persuasive arguments of the salesmen for either device, and his decision will be correct—if he has correctly gathered his facts.

QUESTIONS FOR DISCUSSION

1. Name five principles that govern successful record keeping and comment on each.
2. Why should records be capable of verification?
3. State the four chief purposes of records and comment on each.
4. "Records will not of themselves promote business." Explain.
5. Why are records of doubtful value sometimes adopted?
6. Why should records be designed to order and not copied from other offices?
7. Name six modern tendencies in record keeping and comment on each briefly.
8. List in proper sequence the eight rules in analyzing record keeping.
9. Name several kinds of written records and comment on each kind.

10. "Filing is a form of record keeping." Explain.

11. Distinguish between subject classification and chronological classification. Which is preferable? Why?

12. What are the three requirements of filing?

13. Why is it vitally important to have standard filing methods?

14. Are central files advisable? If so, why? If not, why not?

15. What are the advantages of central filing? Can you think of any disadvantages?

16. What is the first step in the organization of a central filing department? Why is this step necessary? How may it be done?

17. In setting up central filing, what records should be left in certain departments?

18. Comment fully on desk-drawer files. Should they be allowed? Why or why not?

19. What two policies determine how long correspondence should be kept?

20. What are the chief disadvantages of crowded filing cabinets?

21. Name and describe in detail two methods of transferring material in the files.

22. Comment on the destruction of old records.

23. Describe the central tickler file and how it is operated. Of what value is it?

24. What is the purpose of the office manager's control of the filing department?

25. How may the office manager control the work of the filing department?

26. How may the work of the filing department be inspected?

27. What is the purpose of filing equipment?

28. List six requirements of good filing equipment.

29. What may be kept in filing cabinets besides correspondence? Do you think such use is wise and economical? Why or why not?

30. What do you think about the substitution of open shelves for filing cabinets, as practiced by some insurance companies?

31. Compare fully the use of visible systems of indexing with nonvisible equipment.

32. When is the visible system superior to the nonvisible?

Problem I

In the Bonner-Poole Company, a department store, there is a file in the credit department of correspondence with customers, and a file in the accounts payable department of correspondence with suppliers. Each buyer keeps a small file of his own correspondence. Besides these, the personnel director has a file of employees and applications.

Do you recommend a central file for this company? If so, why? If not, why not? Do you recommend one system for all files? Explain.

Problem II

The Davis Brush Company keeps a visible index of its dealings with 6,000 customers. From the invoices, two clerks record each order received, giving the amount in dollars, and classified by 14 commodities. This information is recorded on 5 by 8 cards, there being room on the card for a record, by months, of four years' business. The sales manager consults this record several times each week whenever a question arises about the amount of business the company gets from a particular customer. No other person in the office refers to it.

Is this a superfluous or useless record? Or is it not? If useless, should it be discarded? And if so, how would the sales manager get the information he desires? If it is valuable, what procedure would you recommend to utilize it fully?

Problem III

Norcross & Company, polish manufacturers, have a card list of their customers, by towns. There are 50,000 names in this record and entries are made on it at the rate of 3,000 a month. The entry requires 45 seconds to make on a card 3 by 5 inches in size. These cards are referred to ten or fifteen times a day by the sales manager, who usually comes into the department to see them, but sometimes requests they be brought to him.

Would you recommend a visible or nonvisible system here? Why? What are the advantages of a visible system? What are its disadvantages?

IX

FORMS AND FORM DESIGN

As a rule the books of account show the items of office supplies in two standard accounts: stationery and printing, in which all printing, including advertising, is listed, and office supplies, into which a multitude of articles enter. Because of this form of record, few office managers have made an analysis of the actual amount of money spent on forms and general office supplies. In several offices where this analysis has been made, it was discovered that the office supplies expense for each clerk on the pay roll averages from $50 to $200 annually, according to the type of business and the care with which the items are selected and purchased. It would be advantageous for every office manager to set up special accounts in the books, which will enable him to see just what these things cost, and to record and receive credit for such savings as he will certainly make, after he has given the matter serious and scientific study, and begun to standardize the policy of the company on the selection and purchase of these supplies.

It is in some cases readily possible to save as much as 50 per cent of the cost of forms and supplies, and savings of from 15 to 30 per cent are so common as to be almost the rule.

But the neglect of these possibilities is a very usual condition, and even in some very large office organizations the forms and office supplies are ordered by the purchasing agent, who has received but the most meager instructions from the office manager as to what is wanted and why. At times these instructions are actually left to the department managers. Under such conditions, the purchasing agent, as a rule, endeavors to buy as cheaply as possible, and as a result he does not always buy wisely or economically. With such haphazard methods waste is unavoidable.

The entire subject of forms and office supplies will yield savings in direct proportion to the amount of scientific thought devoted to it.

Standardizing Office Forms

The three factors which govern the form problem are (1) the purpose; (2) the use; and (3) the kind, size, and quality of paper.

1. *The Purpose of the Form.*—Its general purpose is to make clerical work easier than would be possible if a blank sheet of paper were used. There is no advantage in having a special form printed, if a blank sheet of paper will serve the purpose equally well, and, where there is no advantage, it would be wise to eliminate the form entirely. Forms which pass this test also have specific purposes which should be considered, and their examination for such purposes should determine just to what extent the form accomplishes the purpose for which it was designed, and whether or not it does so in the best way.

2. *The Use of the Form.*—The manner in which it is to be used will determine the method of design and the quality of the paper. A form which is to be used on, or filled out on, a typewriter should be specially designed with that usage in view, while one which is to be filled out in pencil would be of very different design, though demanding equal care and consideration in devising.

3. *The Paper for the Form.*—This is a most extensive subject, and some of the most costly errors in the design and use of forms are made in this particular factor. The following extract condensed from an excellent article by C. L. Barnum,[1] technical director of the American Writing Paper Company, gives the most salient points:

Use requirements of paper may be divided for analysis into four main factors:

1. Longevity: the length of time which the paper must resist deterioration.

2. Treatment: the amount and severity of handling, folding or exposure to which the paper will be subjected.

3. Impress: the hand or mechanical method of applying the reading matter, illustrations, decorations or rulings.

4. Appearance: the character or sense appeal in the paper itself.

Longevity is dependent on the character of the materials of which the paper is made, whether rags, chemical wood pulp, or mechanical wood pulp. All wood pulp, especially the mechanical type, deteriorates very rapidly, while cotton rags on the other hand will last indefinitely.

[1] Barnum, C. L., Selecting Paper for Shop and Office Forms, *Management Engineering*, Vol. IV, No. 1.

Where permanency is required rag stock is necessary, the degree of permanency being measured by the rag content of the paper.

Treatment.—The strength of the paper is governed by the quality and kind of materials used, and the care taken in manufacture. Washing, bleaching, and beating of paper reduces its strength, and the speed of the machine producing it also has this effect. "Machine-dried" paper is weakened by that process, while "loft drying" tends to preserve the strength of the original material.

Impress.—Here, the shrinkage of the paper must be taken into account. Absorbence is a quality needed in mimeograph work; for pen and pencil writing, nonabsorbency and erasive qualities are demanded. The finish, weight, color, opacity, and stiffness must also be considered with respect to the impress and the method of its application.

Appearance.—This is dependent upon the finish, color, weight, and general quality of the paper used. The sense appeal made by paper is the only one of the four factors of use, which personal opinion may influence. Most of the specific finishes are obtained by sheet plating, which consists of transferring a surface impression from a fabric to the paper, as in "linen-finished" or "lawn-finished" papers.

Barnum then gives the following figures as to the content of paper for the various requirements on the subject of longevity:

Time to be kept	Life and make-up of paper
1 to 3 years	Temporary—no rags necessary
5 to 15 years	Semipermanent—25 to 60 per cent rag content
20 years or over	Permanent—75 to 100 per cent rag necessary

Probably the largest part of office forms have no use after 3 years, so that as far as the requirement of longevity is concerned, a much cheaper paper will suffice than is now used as a general practice. Of course, for stock certificates, bonds, deeds, life insurance policies, and other forms of similar character, paper having a permanent character is necessary. The life of most legal documents, or papers which may be used as evidence, is controlled by statutory limitation as to time, after which they become worthless. These, therefore, would fall most into the temporary class—a few of them perhaps into the semipermanent.

In considering the treatment to which paper will be subjected in the average office forms, several factors at once become

apparent. It would be folly to provide the same quality of paper for an invoice form which receives a very limited amount of handling, as for the pages of a loose-leaf ledger which are thumbed over many times daily. The amount, frequency, and length of time of the handling are also matters for consideration. Some forms are subjected to rough handling and should be of a quality of paper to stand it. Others require a great deal of folding; proper tests should be made. Factory forms, which may be exposed to dirt, moisture, fumes, and so forth, or which are carried by delivery men or collectors, are frequently subjected to much abrasion and general rough usage. Where such factors enter into the question of treatment they should be given consideration.

Barnum says that bond papers have a large ratio of strength to weight. Ledger papers are manufactured to supply a paper of even formation, smooth, uniform finish, and good wearing and erasing qualities. Generally speaking, leaving weight out of consideration, the ledger-paper grades parallel the bond-paper grades with reference to paper qualities; that is, a first-grade ledger paper, though heavier than a first-grade bond paper, is not much greater in strength. It should be remembered that paper is sold by the pound, and ledger paper is more expensive per sheet than a bond paper of equal strength. Flat writing papers vary in grade from all-wood pulp to all-rag, but as the finish is beaten primarily to obtain uniform formation and a higher degree of capacity, the strength is low, and they have little or no folding qualities.

Bond, ledger, flat writing papers, and index bristols, are developed particularly for pen and pencil writing.

For mimeograph work, an unsized, absorbent paper should be used. If a bond paper is used, as when a form is to be produced on which pen writing must be placed, it will be necessary to "slip sheet" with blotters, to avoid smudging.

For typewriting, a bond paper is preferable, and the number of manifold copies required will dictate the weight. The lower grades of bonds will not stand much erasing, as the surface is thereby injured.

All bonds, ledgers, writings, and bristols may be machine ruled, though care must be exercised with the unglazed, high-grade, loft-dried bonds, on account of the "cockle" to the sheet.

Generally speaking, bond papers should be used for pencil writing, ledger and flat writings for pen writing, and bristols for either method of impress. There is a greater "tooth" to bond papers, particularly in the unglazed higher grades, that produces a sharp, clear-cut impression from a hard pencil.

The factor of appearance cannot be definitely classified, as it is very largely a matter of personal choice, but, generally speaking, consideration should be given as to whether the appearance of the form is representative or suggestive of the company. A firm which endeavors to make a distinct appeal to wealthy or refined persons would, for example, be correct in having certain of its forms printed on paper which it judged would have a sense appeal to those receiving them.

Barnum believes that a 15 per cent saving in the paper cost can usually be made, while 30 per cent savings are frequent.

Standard Paper Sizes

The Committee on Simplification of Paper Sizes, appointed by the National Bureau of Standards, Department of Commerce, Washington, D. C., has recently undertaken to standardize on a few sizes, and as a result of its work the following sizes are now generally recognized:

Single	Double
17 by 22 inches	22 by 34 inches
19 by 24 inches	24 by 38 inches
17 by 28 inches	28 by 34 inches

These standards have been developed by the United Typothetae of America and the National Association of Employing Lithographers.

The sheet sizes for index bristols are 20½ by 24¾ inches, 22½ by 28½ inches and 25½ by 30½ inches. The first mentioned size provides for 3- by 5- , 4- by 6- , and 5- by 8-inch index cards; the second for a 3½- by 5½-inch card for mailing or for enclosure in a No. 6¾ commercial envelope, and the last also provides for a 3- by 5-inch index card, but is a larger sheet than the first named and therefore more economical to print where large quantities are required.

The office manager who desires to assist in the general reduction of the cost of paper used in office forms can advance this

movement towards standardization by designing forms which will cut from sheets of these sizes. As a rule there is no necessity for more than the following nine sizes:

3 by 5	7 by 8½	4 by 6
3½ by 8½	8½ by 14	5½ by 8½
4½ by 5½	3½ by 4¼	8½ by 11

Loose-leaf binders are not universally standardized, but it is not absolutely necessary to increase the number of sizes for this reason, for as a rule, the binders will accommodate a smaller sized sheet than they are made for.

The standard sizes for cards made from index bristol, and which accommodate all standard equipment are:

3 by 5
4 by 6
5 by 8

In one office where the forms were examined, 75 different sizes were found, and, with the exception of 2 or 3 sizes which were required on home office reports, this multitude of sizes was reduced to the 9 above mentioned.

Standard Type Faces for Forms

From the standpoint of good composition alone, it is not advisable to use more than one, or at the most, two type faces on any one printed sheet. Where one type face is used there is a distinctive tone achieved that cannot be secured in any other way. Many offices are careless on this point in regard to their forms, which at the same time would not permit an equally low grade of composition on any of their advertising matter. It is by no means unusual to find forms with several type faces, and if the entire collection of forms of almost any office were examined, a miscellaneous collection of type faces could be pointed out. Some type faces are entirely unsuited for form use; some are hard to read, and some have hair lines which almost disappear under artificial light. It is advisable, therefore, to pick a type face which has been tested and found to answer all the requirements of good form design, and for this purpose most expert designers of forms have practically agreed upon a Gothic face. There are many Gothics from which to choose, some very

well adapted and some altogether unfit. Many office managers have standardized on the face illustrated in Fig. 9.

This face is especially recommended because it is open, round, clear, and easy to read, and if it is necessary to blueprint or photostat it, good, clear copies will result. It can be read easily even in poor light and it makes a neat-appearing form. However, if the space for column headings is limited, Alternate Gothic —a condensed face—should be used.

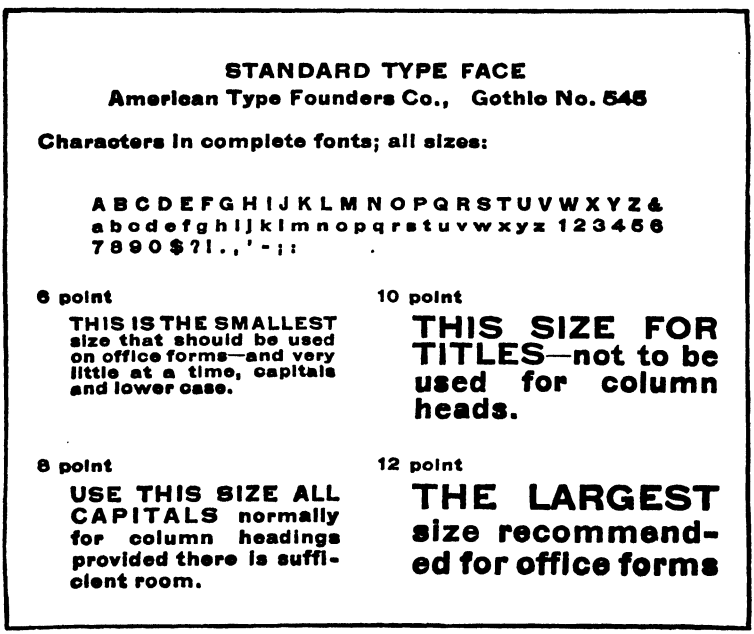


Fig. 9.—Standard type face for forms.

Standardizing the Colors

Colors should never be used on forms, unless they are necessary for the purpose of a color system in which the various colors have a special significance.

Punching, Scoring, and Perforating

Punching for post or ring binders is sometimes necessary for forms, and with a regular system this work can be anticipated and the forms punched by the printer, who, by locking a special device in his press, can punch each form as it is printed, doing a

much better job than could be done afterward. Punching for ring binders can be done in the same way, though it is not usually done, as ring binders are not satisfactory for holding together a large quantity of sheets and are therefore not generally used for anything except miscellaneous data books. In either case, however, the binders should as far as possible be standardized, so that the sheets in them will be interchangeable, and a hand punch set for standard punching can be used when necessary. In specifying holes to be punched, the measurements should be given as from center to center of the holes, and a sample sheet should be tested in the binders, before the punching job is completed. Some types of binders require a special form of punching which can be done only by the maker, who has special machinery for this purpose, and who will do the work at cost, or at least very cheaply.

Scoring signifies printing or impressing a single line on the form, which creases the paper so that it will fold readily. Filing folders, for example, are scored.

Perforating may consist either of a row of small holes, as on a postage stamp, or a series of short dashes which cut partially through the paper. For form work, perforating of either type should be avoided, as the edge of the perforated side will be rough, and make handling, jogging, and stacking difficult. This type of work must be done by machinery, and most printers are equipped to do it.

Quantity to Be Ordered at One Time

The quantity of forms to be ordered is rarely standardized. Many hundreds of thousands of dollars' worth of obsolete forms are destroyed annually. Much of this waste could be avoided if, before ordering, the requirements were analyzed by the office manager.

With any new form, it will be found profitable to proceed slowly. As a rule, no more than a months' supply should be ordered of a *new* form, unless it takes several weeks to produce. In this case the time required for delivery should be added to the month in determining the amount to order.

For an established or regular form, on which the monthly consumption is known, there should be a standard rule based upon some policy similar to those mentioned below.

Some offices order a year's supply on all forms, on the theory that when bought in manufacturing quantities, the cost per sheet will be lower than when bought in small quantities. This is certainly true in some cases, but frequently a manufacturing quantity can be had with one-half or one-quarter of a year's supply, and the difference on larger quantities is not appreciable. Such rule, in any case, requires a relatively large investment in forms, which are a most unstable variety of asset.

Other offices have a quarterly supply rule on the theory that the investment is small and that it is unwise to tie up capital in forms. The theory fails where, on some forms, the three months' supply is not sufficient to constitute a manufacturing quantity.

Still others hold to a middle policy, and order for six months, thus having a small investment, with more forms that reach a manufacturing quantity.

A better plan than any of the above would be to standardize upon the quantity to be ordered in each case, this standardization being based upon the following considerations:

1. Quantity used.
2. Quantity required to make a manufacturing order.
3. Amount of capital invested.
4. Saving to be made if ordered in quantities.
5. Possibility of changes in the form.

For example, a rule could be established that all sheet forms, where the manufacturing quantity is 1,000 and where less than 500 are to be used in a quarter, should be ordered in 1,000 lots, provided the saving to be made exceeded 6 per cent interest on the capital invested, and provided the form is established procedure, and no changes are likely to take place in it. A set of such rules governing the different conditions on forms of various kinds could easily be prepared, and the amount to order could then be written on the stock card. Thereafter the ordering would be automatically handled, accompanied by all the advantages of the careful thought given to the standards originally set.

Standardizing the Packing

When forms are delivered to the buyer, they are generally packed in small bundles for convenience in use. This is a service the printer renders his customers, but one that the latter do not usually take advantage of to the fullest extent. The buyer rarely

gives the printer instructions on the subject, and as a consequence the latter makes up packages of 500 or 1,000, or some other amount which seems to him a handy package. He has no way of knowing what a month's or a year's supply of the form is. If, however, he were instructed by the buyer to wrap in packages a sufficient amount for one month's supply, and if the latter then opened but one package at a time, it would prove a simple matter to protect the remainder of the stock and keep the supply room looking neat all the time. Even if a month's supply is only 100 sheets, and this means five times as much wrapping as the printer is accustomed to doing, he will charge but a small amount for the work, and it will be well worth the charge. The size of the package should also be marked on the stock cards, so that this need not be thought of each time printing is ordered.

Principles of Form Design

1. *Size.*—No form should be larger than is necessary to enable the matter which is to be written thereon to be entered in readable form, unless this size would be nonstandard, and then it should be enlarged only a sufficient amount to place it within the nearest standard size. (*a*) Column widths should be spacious enough to permit the largest number or description used, to be written in clearly, and no larger. (*b*) Column length should be long enough to fit the average page of entries—no longer, for there is no necessity for making it fit the largest number of entries that may be made, as two sheets can be used in these cases. (*c*) The description at the top of the form should be brief, concise, and not wasteful of the surface space.

2. *Simple in Design.*—Forms should be simply designed, and their use easy to learn. Column heads should be clearly described, rather than marked with some cryptic, obscure symbol that may puzzle the user. Where it is necessary to include instructions as to the use of the form, such instructions should be printed on the form itself, concisely, though clearly, but this should not be done unless the use of the form cannot be readily understood without it, as descriptions otherwise merely waste space.

3. *Easy to Use.*—Forms should be easy to use, a statement that perhaps can be best explained by an actual example (Fig. 10). In this case it was necessary to copy the information on an appli-

cation blank to a special form, and though the same items appeared on each form, they did not appear in the same order, so the copyist was compelled to take one item perhaps from the top of the form, and the next from the bottom or the middle or elsewhere; that is, she had to search for it. This form was redesigned so that the information appeared in the same order on each form, and the copying labor was, in consequence, greatly reduced. This applies to all sorts of forms where the entry is to be copied from another—the information should be arranged in logical and consecutive order. Ledger sheets in a post binder should not require writing too near the binding edge, as writing there is difficult. Many other examples of forms that are not easy to use could be quoted.

4. *Placement of Information.*—Information should be placed on the form where it will best serve its purpose. For example, if cards are filed alphabetically by name, the operation of finding them is to "finger" the top of the card. If the name is placed near the top, it is easy to find, but if it is placed, say, an inch below the top, the operation of finding will take several times as long. Forms which bear consecutive numbers should have such numbers placed where they can be readily seen in handling the papers, and information on forms that is most frequently used should be placed in such position on the form as to be most readily accessible.

5. *Special Considerations.*—Forms designed for use on the bookkeeping, billing, or adding machines should be so designed that there will be a minimum number of starting places for the typist, for each new starting position on the form requires an extra operation in setting the machine, a needless effort that can be avoided by proper design.

6. *Make-up.*—Forms should be so designed that they logically divide into three parts—not necessarily equal. (*a*) All identification matter, such as name and address, number, and so forth, should be somewhere near the top of the form, except in cases where the form is designed to be bound at the top. In such cases, the rule should be reversed. For ease in handling, the identification matter can in most cases be at either the top or the right-hand side of the form. (*b*) The data or entries which are to be copied on the form should constitute the second part, the body of the document. (*c*) Special instructions, such as shipping

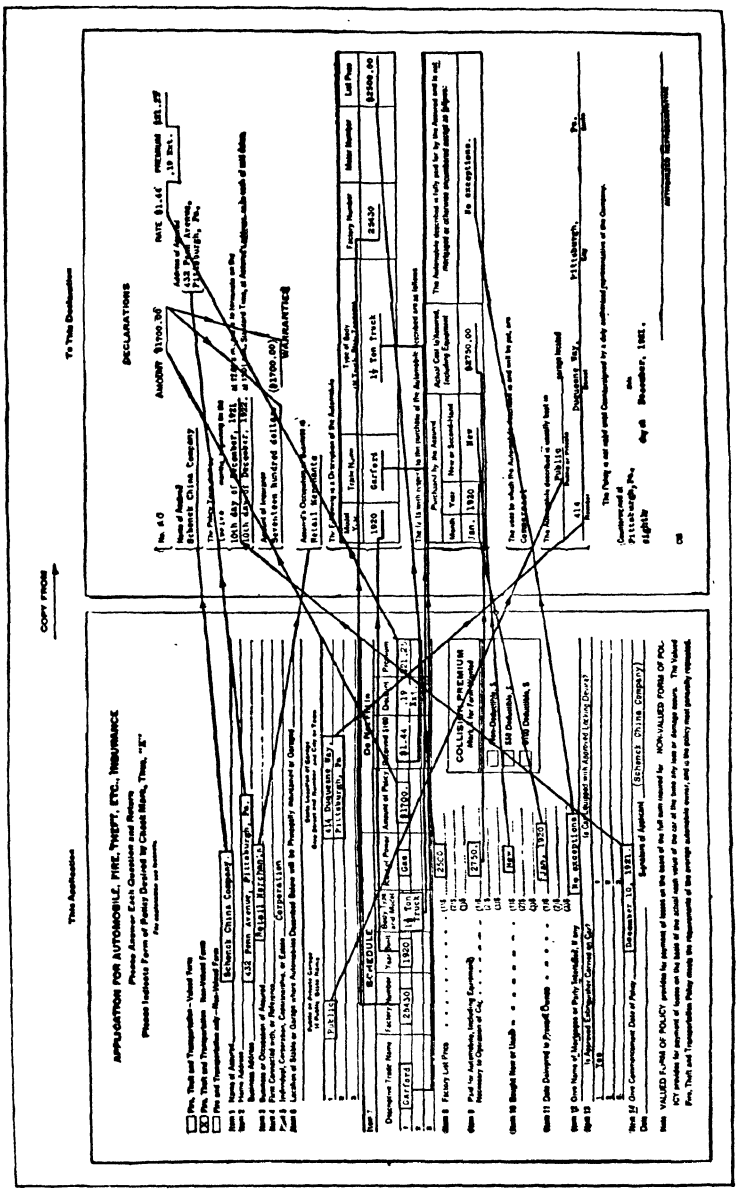


FIG. 10.—Faulty arrangement of forms for copying.

instructions on an order form, should be placed in the third, or remaining part. The object of this division is to secure a general logical rule for all forms, so that one clerk can readily use the forms of another department than his own, should occasion arise.

7. *Every Form Should Have a Name and Number.*—A name is more easily remembered than a number, and most clerks identify a form by name rather than number, when they have use for it. To avoid confusion, all such names should be standardized and printed on the form, and the number likewise, the latter for the records of the stock keeper. The name should be short, yet clearly descriptive, and the numbering system should be carefully thought out. Most companies use a simple consecutive number from one up, the latest form having the highest number. This, though simple enough, cannot be regarded as order, for after the lapse of a few years there will be many discarded numbers because of obsolete forms, and the system will become confused. The Dewey decimal system (erroneously so called) is to be preferred. The first two numbers in this system could be allotted to the various departments, allowing for 99 of them if necessary; following these two numbers, a decimal point can be placed and, following that, the number of the form. Thus, 10.44 would indicate Form 44 in department 10. With this system, if it is desired to collect all the forms of one department together, it is a simple matter. The first two numbers can be used to designate any other logical division instead of departments, if it is so desired. Both name and number can be printed in small type on the lower right-hand corner of the page.

8. *Ruled Lines.*—Forms intended for typewriter use should not have horizontal ruled lines. In designing the form, measure the distance from the top of the sheet to the first line of typing and indicate it so that when inserting the sheet in the typewriter it may be rolled up to the first line without further adjustment. Subsequent typing lines should be spaced six to the inch, if single space, and three to the inch, if double. For forms to be written upon with pen or pencil, evenly spaced lines should be provided.

There are several methods of producing lines on a form, the oldest of which, and one which is still used to a large extent, is known as pen-ruled lines. These are the blue, green, and red lines customarily used on bookkeeping forms. They are produced by setting up a series of ruling pens on a machine, the

lines running in one direction being ruled at the same time; if there are lines required in two directions, the material must be run through the machine twice. It is usually more expensive to

Date of These Specifications .....

Drawn by .....

Checked by .....

Examined by .....

Approved by .....

Revised by .....

on .....

Revised by .....

on .....

Revised by .....

on .....

Revised by .....

on .....

Standard Form Specifications

Form No. .....

Name of form .....

Department using ..... Section ..... Auth. by .....

Size of form ..... Which cuts ..... Sheets from .....

Grain: long way? ..... Short way? .....)
Stock generally runs with the grain, the long way

Printed? ..... Mimeographed? ..... Ditto? .....

Ruled? {Pen ..... / Type ..... Padded? ..... Punched? ..... Numbered? ..... Perforated? ..... Gummed? .....

One side? ..... Two sides? ..... Tumble? ..... Folder? ..... Pages? .....

Plates? ..... If so, how many ..... Wax; ..... Electro; ..... Zinc.

If so, where are they? ..... Condition? .....

	STOCK			INK	RULING (Color)	
	Grade	Size & Wt. Basis	Color	Color	Horizontal	Vertical
Orig.						
Dup.						
Trip.						
Quad.						
Quint.						

PADDING: At top ..... ; at left ..... ; at right .....;
If in sets, No. of sheets to set ..... ; No. of sets to pad .....;
If bound, use side stitch ..... or saddle stitch ....., and specify cover stock.
If not in sets, No. of sheets to pad .....

PUNCHING: No of holes ..... ; distance from outside center to outside center ..... in.
Size of holes ..... inches diameter; Round ..... Slotted .....
To fit ..... Binder No. .....
(Paste punched end of sheet below, to show punching edge at top)

NUMBERING: From ..... to ..... in ..... ink.
(Describe exactly where numbering is to be placed)

PERFORATING: Describe exactly where perforating is to be placed

LINE SPACING: (If form is to be used in typewriter)

FIG. 11.—The use of standard specifications prevents overlooking any important points and encourages uniform bidding by suppliers.

rule lines, especially on forms that are ordered in large quantities, than it is to print them by other methods. If only a small quantity of forms is to be ordered, and the ruling is complicated,

occasionally pen ruling will be cheaper. It is claimed also that the use of colored lines, which is possible by pen ruling, is an advantage, but the particular advantage claimed can also be secured by printing the lines of various widths or doubling them.

Printed lines are usually obtained in two ways, (1) by the cut rule process and (2) by double printing.

The double-printing process is much simpler and, on small runs, cheaper. The printer sets up brass rules for all lines which run in one direction, and then prints the quantity desired; he then sets up the rules for all lines which run in the opposite direction and puts the job through the press again. On small runs this double operation consumes less time than would be required to cut and join the rules, and much neater looking work is the result.

For small runs of complicated forms, lithography is perhaps the cheapest method.

The General Process of Designing Forms

The usual method of designing a form in the average office begins with the designer having a preliminary conversation on the subject with some persons interested. He then gets out a sheet of paper, a ruler, and pen or pencil, and starts work, first making an elaborate ruling of lines in vertical and horizontal direction and then lettering in the wording which is to appear on the form. In some cases this is larger than the space allowed for it, so he does some erasing and starts over again, and after getting the original sheet into a hopeless mess, discards it and prepares a new one. He will usually draw up half a dozen designs before he gets one which suits him. This is then sent to the printer, generally with but partial and insufficient instructions, and when it comes back in proof form, the designer finds that he must make many changes in it. The process is exceedingly laborious and inefficient, the initial error being that the designer has not defined his purpose, analyzed his problem, or planned his work with sufficient care beforehand.

The first step in form designing is to define carefully the purpose for which the form is to be used, and in this process it is well to have a checking sheet in the form of a standard questionnaire. All the things that the designer needs to know about any form should be on this sheet. The following list of questions is sug-

gestive of what is needed in this respect, and from it, the designer can make up his own:

1. What is the purpose of the form?
2. If more than one purpose, which is the most important?
3. Is the purpose justifiable?
4. Will the purpose of the form be fully accomplished by its use?
5. Is there another form, for the same or a similar purpose, now in use elsewhere in the office?

A consideration of these five questions will often cause the designer to abandon the making of the form altogether—a very desirable thing in general, as most offices have too many. The next four will indicate the kind of paper.

6. What will be the general style of the form?
7. How is it to be used?
8. How is it to be preserved after making?
9. How many copies are to be made—and how?

The following four questions will give the designer a general idea of the kind of form he is to make:

10. From where does the information come, which is to be entered on the form?
11. In what manner does the original information come?
12. Is there a cheaper or more convenient method of getting the information?
13. Is the information always complete?

A study of the manner in which the information is to be received, to be written on the form, will frequently suggest changes either in the form as originally conceived, or in the routine of providing the information, and all these changes should be made before designing the form.

14. Can energy or time be saved by:
    - Making more than one copy at a time?
    - Eliminating entries?
    - Abbreviating entries?
    - Eliminating writing by use of check marks?
    - Eliminating writing by use of symbols?
    - Eliminating lines?
    - Proper sequence of information?
    - Will size affect the ease of use?
15. What should be the size of the form?
16. What quality of paper should be used?

After studying these last questions the designer will be practically ready to go ahead with the design, for he will have a fairly complete mental picture of what he wishes to accomplish and how to do it.

The next step is to list, on a sheet of paper, each title, description, and column heading that he proposes to use, this list being divided into the three parts before described: (*a*) the identification material, (*b*) the main body of the form with entries, and (*c*) the special instructions. For example:

1. To be charged to:
   Name.
   Address.
   Our order number.
   Date.
   Entered.
   Customer's order number.

2. Part name:
   Size.
   Catalogue number.
   Quantity.
   Price, and so forth.

Listed in this manner, this information can be altered more readily than if written on a form; description can be shortened, words abbreviated, order changed, and so forth.

It will then be necessary to determine the general order in which the information is to appear on the finished form. This need only comprise a rough blocking out of the form with a pencil; no free hand, no ruling; only putting in sufficient lines or words to indicate the general order. In this work, consideration must of course be given to the principles previously outlined, the logical order of the material, the ease and use of the form, and so forth.

Then comes the determination of the length and width of columns. The latter is to be determined only by the number of digits or letters that will be written in the space, and not by the length of the column title, as is often done. For forms which are to be typewritten, the width of the columns may be readily determined by using a scale, which can be quickly made on the typewriter itself—the kind that is to be used (pica or elite type) as follows:

```
1    5    10   15   20   25   30   35   40   45
....!....!....!....!....!....!....!....!....!...
```

If the column must be of sufficient width to take a figure such as 147.92, six spaces on the above scale will be needed, plus

two for the dividing lines on each side. After determining the width of all columns, the general width of the form will be known, and when the amount of space required for descriptive matter and for the average number of entries is determined, this knowledge will decide the length.

It will now be possible to decide upon the standard size which is to be used for the form, and a sheet of this size, or preferably larger, with the size bounded by pencil lines, can be taken to rule up the sample sheet. All ruling that is to appear on the form should first be made with a hard pencil, just as it is finally to appear. No lettering whatever should appear on this sample, it being only necessary to number the places where the lettering is to go, and then prepare a typewritten sheet with numbered descriptions and headings to correspond. The printer can set up his form from the typewritten copy much better than from the lettering, and considerable time will be saved. Before deciding the lettering which is to appear on the form, however, consideration should be given to the size of the space in which it is to appear. In narrow columns the words can often be abbreviated to fit the space. If they are written on a machine with Elite type, it is a simple matter to judge the amount of space that the lettering will require, and the words which are too long can be abbreviated accordingly.

If a form is designed according to the principles and in the manner here described, the work will be better done and it will be unnecessary to draw more than one sketch (not including the rough, freehand, blocking-out sketch) the final one which is given to the printer. If the questions listed above are given careful consideration, the resultant form will be economical of energy, time, space, and material.

Providing for Changes

When a form has been in use for some time, a minor change of some sort will frequently suggest itself, but it may at the same time happen that there is a large stock of the form on hand which the management is reluctant to discard to make this change. Yet the suggestion, if it is a good one, should not be entirely lost to the management, and to prevent this, a special folder should be provided for proposed changes in forms. The suggestion should be filed in this folder, and a memorandum placed on the

stock card for this item, reading: "When ordering new forms, consult change folder."

Questions for Discussion

1. What is the purpose of a form?
2. State three factors governing the problem of forms and comment on each briefly.
3. List four factors affecting the choice of paper and explain each briefly.
4. Why does the length of time a form is to be kept affect the choice of paper?
5. What effect has the treatment the form will receive on the choice of paper for forms?
6. Papers for office forms are usually chosen from bonds, ledgers, flat writings, and index bristols. Comment on the characteristics of each.
7. What kind of paper is best for typewriting?
8. What advantages would you expect to result from the standardization of paper into a few sizes?
9. What standard sizes of paper are recommended? Why?
10. How many sizes of forms are advisable? Why?
11. What are the advantages of using a standard type face for forms?
12. When should colors be used on forms? Why not otherwise?
13. Explain the punching of holes for ring or post binders.
14. Explain scoring and perforating. Where do you think these might be used?
15. Explain the basis upon which to determine the quantity of forms to be ordered.
16. Why should no more than a month's supply of a new form be ordered ordinarily?
17. What is meant by "standardizing the packing" of forms, and what benefits would you expect to result from it?
18. List eight principles of form design and comment on each.
19. In determining the size of a proposed form, consideration must also be given to column widths, column lengths, and the description. What features should be observed with respect to each of these three items?
20. Comment on simplicity in form design.

21. What effect should ease of use have upon the design of a form?

22. "Information should be placed on the form where it will best serve its purpose." Explain.

23. What suggestions would you make as to forms designed for use on bookkeeping, billing, or adding machines? Why?

24. Into what three parts should forms be divided? Why?

25. Why should every form have a name and number?

26. Do you agree that most clerks identify a form by name rather than by number? Give an example.

27. "Forms intended for typewriting use should not have horizontal ruled lines." Why not?

28. In what ways may lines be ruled on forms? What are the advantages and disadvantages of each way?

29. What suggestions would you make for a form-numbering system? What advantages would you expect to result from such a system?

30. Comment on the general process of designing forms.

31. What are the purposes of the 16 questions suggested as to form design?

32. After answering the 16 questions for the form designer, what is the next step?

33. What provision should be made for changes in present forms, to be made when the form is next printed?

Problem

In a preinvoicing routine in the office of the McLean Button Company, it is necessary to have 17 duplicate copies for use in various sections of the office. There are approximately 300 orders daily.

Design an invoice form for the company, specifying size, paper, type, and method of printing.

X

STATIONERY AND OFFICE SUPPLIES

There are many possibilities of waste in the handling of office stationery, and it has been claimed, with a great weight of evidence to support the claim, that the cost of ordering, storing, and issuance of stationery stock can be reduced in the average office approximately 25 per cent.

The first of these possibilities of waste lies in the buying and keeping of too much stock, and while it is true that this is hardly the responsibility of the stock keeper, even where he is the person who orders the material, it is nevertheless a serious source of waste in stock-keeping methods.

Again, with a defective system it is easily possible to run short of important stock items, which in emergencies will necessitate rush orders, the delay often resulting in loss of important business through inability to get stock on time.

Considerable loss may also be sustained through waste and deterioration of material due to disorderly arrangement, and under certain conditions this loss may be extremely serious.

Wasteful consumption of stock, through the absence of an orderly and controlled issuing system, or an inefficient one, is also of frequent occurrence and counts heavily in the expense.

The Importance of the Problem

This naturally varies with the size of the office and in one of 20 people is obviously not of such absolute importance as in one of 500, though it is the same problem in kind if not in degree. It also varies according to the type of office, for as will be recognized, the cost of stationery is much greater, in proportion, in the office of an insurance company than it would be in a factory office. In the third place the general methods have also an effect upon its importance; in an office with an advertising business attached where much advertising material is stored in the same room as the office stationery, it is obvious that the problem becomes increasingly important.

In an office of 200 people there may be a stock of from $20,000 to $50,000 worth of expensive material which, if not properly handled, may in very large part become expensive junk.

In addition, stock keeping is a function the neglect of which is certain to interfere seriously with the smooth running of an office, and for both these reasons it should command the serious attention of the office manager.

The Elements of Cost

The first cost in this problem is the space occupied by the stockroom, including its lighting, heating, and ventilation. This space, though not necessarily as choice as that occupied by the clerks, usually costs as much for rent.

Next comes the depreciation of the storage equipment, the first cost of which is, of course, a capital investment. But this equipment can depreciate very rapidly in value if it is, in the first place, selected without sufficient thought, and in the second, if it is roughly handled thereafter.

Where handling equipment, such as trucks, elevators, ladders, and similar apparatus, is used, the depreciation on these objects must also be considered.

A most important consideration is the interest on the capital tied up in stationery stock, which may be comparatively light or heavy according to the efficiency of the stock-keeping methods.

The cost of the labor of keeping stock is an item which also depends on efficiency of the methods used, as does the labor of issuing and distributing the stock, which in proportion to the cost of materials is a very heavy item.

In addition there is the possible loss of materials through faulty stock-keeping methods.

And finally, the cost of clerical time lost through these faulty methods is to be considered in the general problem.

What Are the Requirements?

A satisfactory stock-keeping system requires:

1. That as little stock as possible be kept on hand, in order to save the cost of space, depreciation, interest on capital, and the labor of handling. This must, however, be so planned that no danger of loss through delaying the work of clerks in the office

will arise. The plan must also provide for a sufficient amount of each item to make economical purchases possible.

2. Material should be stored in such a manner as to save space, time, and energy, and to avoid deterioration or loss, or possible destruction, while it is kept in stock. Stationery depreciates very rapidly upon exposure; it curls, gets dirty and discolored and crumples easily, and this deterioration may render it practically worthless. Some forms are by no means inexpensive, and the loss of only a few of such items will make an appreciable difference in the total expense.

3. The issuing system should be planned so as to save time, energy, and material and should make it possible to check wasteful consumption. An issuance of stock intended to last for a week requires no longer than the issuance of a supply for one day, and stock issued at any time, without periodicity, greatly increases the labor of issuing. The stock keeper should be informed of the quantity that is likely to be used of each item in a definite period of time, and the amount he is authorized to issue, so that he can do his part intelligently in checking wasteful consumption.

4. The requisitioning system should be the product of careful thought and planning, as through it the possibility of wasteful consumption can be largely checked at its source.

Main Factors of the Problem

The following principal factors in the problem of storing stationery are applicable to even the smallest office:

1. *Location of the Stockroom.*—The stockroom should be located in space that is less adapted for clerical use than any other space in the office; if possible, it should have daylight, since otherwise it will be necessary to burn a large volume of artificial light. The location should, if possible, be central, that is, within easy reach of all departments using stock.

2. *Physical Arrangement of Stock.*—This is a major factor. Stock which is well arranged is not likely to suffer loss. If the arrangement is poor, if some bins are crowded and others are empty, if stock is piled on the tops of the shelves, in the aisles, and in other inconvenient places, there is a loss not only of energy in reaching it, but of the material itself because it will not be so carefully handled.

3. *Classification of Stock, and Location System.*—Stock should be classified by some logical system, not merely treated as a lot

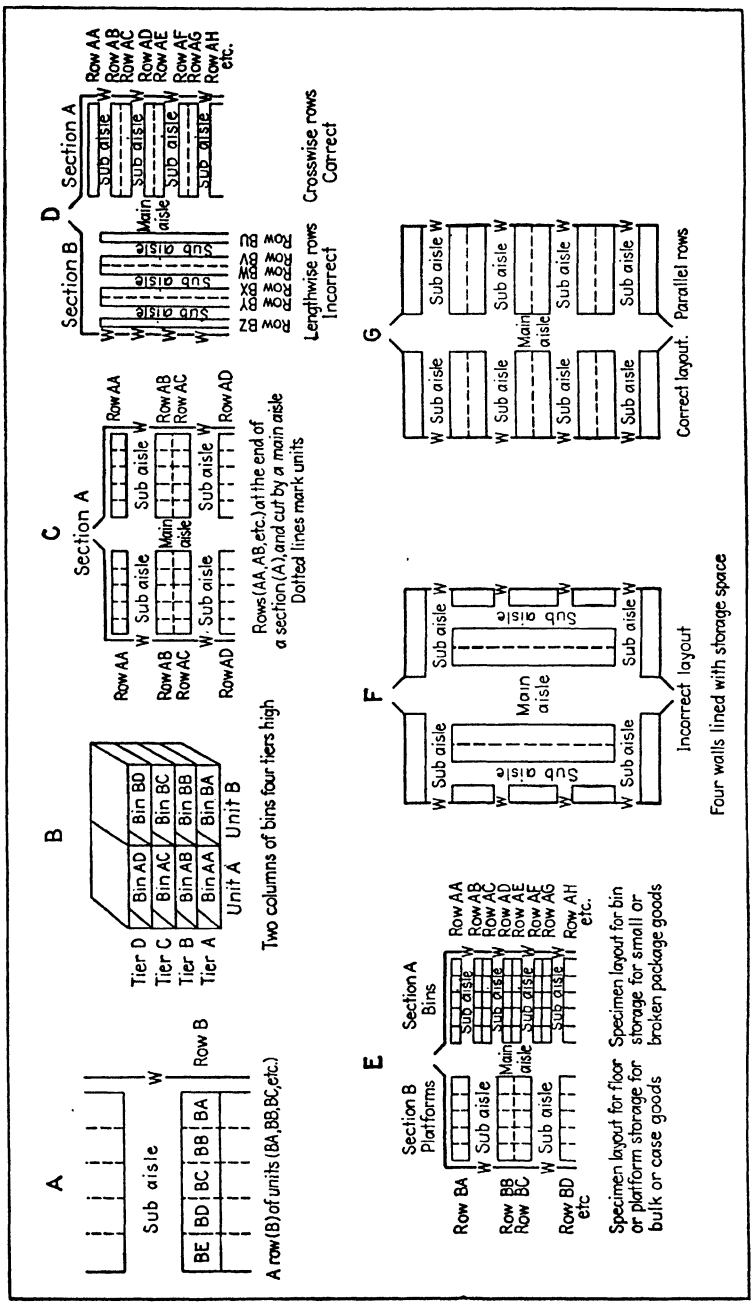


FIG. 12.—Diagrams of various layouts for storage space.

of miscellaneous supply items. A location system should be devised which is simply learned and which will quickly and unerringly enable anyone having the location number to find any particular item. This can be arranged easily, whether the stock comprises a single row of shelves or occupies an acre of storerooms. Figure 12 will suggest several possibilities.

4. *Issuance of Stock.*—Stock should be issued only in accordance with a well-defined system. Under no circumstances should stock be issued at the request of any comer.

5. *Control of Consumption.*—With certain kinds of stationery there is little danger of overconsumption, but with many items there is a possibility of the clerks overstocking, and in some cases there is a constant temptation to stock up the "home office." Pencils, erasers, typewriter ribbons, rulers, pins, clips, and other small utilities have in several cases found their way out of the office and into the homes of the employees in more or less mysterious manner.

6. *Control of Amount on Hand.*—Unless this is carefully planned and maintained, there is considerable danger of overstocking, and on the other hand a very positive danger of running short of certain indispensable items at most inconvenient times.

Factors in the Location of the Stockroom

1. *Amount of Stock to Be Stored.*—The amount of stock to be stored will often constitute a determining factor. If it can possibly be avoided, the stock should not be divided into several rooms.

2. *The number and location of points* to which stock is to be issued must be considered, as it is advantageous to have the stockroom as centrally located as possible.

3. *The amount to be distributed,* and the frequency and method of delivery, will also influence the question of location, sometimes more in one office than another, but to a certain extent in all.

4. *The method of receiving supplies,* the facilities for their reception and transportation into the stockroom, are influences upon the location.

Some stockroom problems will also be affected by the possibility of supervision, the means of theft prevention, and the avoidance of a fire hazard, even though in a minor way.

Advantages of Centralized Stock Keeping

In many offices the stock keeping is almost completely decentralized, though the undoubted tendency is toward centralization, the chief advantage of this being first in the economy of space and second in the economy of labor. One office which had two stationery stockrooms, one on each floor of its office, saved a most valuable area of floor space and the labor of one stock clerk by centralization.

Centralization gives better utilization of storage equipment. Where stationery is stored in a department, a better appearing and consequently more expensive set of shelving must be provided, and there is almost certain to be some space wasted on each shelf, a waste that in the aggregate is no inconsiderable item. With a central stockroom, less valuable space can be provided, and cheaper, though equally useful, equipment used, which can be built as high as desired, within the limits of the ceiling and with due regard to the sprinkler system if there is one; in addition, these shelves can be kept full in every part, thus making for a great economy of space.

Still another advantage of centralized stock keeping is that it permits a better utilization of the stock. Items which are used in common by a number of departments can be carried in smaller amounts in a central room than would be prudent with decentralized stock keeping. Supervision and stock control are also made simpler.

There is, however, one disadvantage of centralization, although it applies only to offices that cover a large area—the distance for delivery may be too great to be economical. Yet even in an office spread over a large area, such as those often connected with factories, this is but a slight disadvantage and is usually more than offset by the advantages. In such cases, substations may be established with advantage.

Physical Arrangement

In small offices where the stock must be stored in the main office room, cabinets with doors should be provided; but in all enclosed stockrooms separated from the office, open shelves should be used, for they are less expensive and more readily

accessible and, besides, can be constructed to utilize far more of the cubical space than can a cabinet.

Under all circumstances, the shelving should be adjustable, the most convenient for office use being that type with which adjustments are possible over a distance of 1 or 2 inches. If the shelves are all of the same size and nonadjustable, there will be much waste of space on items, the regular stock of which is small.

Steel shelving is better than wooden equipment and much cheaper when the possibility of moving is considered, for it will be necessary either to abandon or to destroy the latter in moving, or to spend more than it is worth to move it and set it up in the new location. The equipment used should be in standard units, so that later, if necessary, the arrangement can be changed.

In every stockroom, space should be provided for the reception and unpacking of stationery coming in. Ample aisles should also be provided, with good light between them. If a truck is used for issuing and delivering stock to departments, space should be provided for it in the stockroom. If the aisles are sufficiently wide for its passage, it can be pushed through them and loaded with little labor.

All reserve stock should be kept in the original package, and only enough for current use should be unpacked. For this reason, the order to the printer, as mentioned elsewhere, should specify the size of the package desired, so that it will never be necessary to have more than a small quantity unwrapped. The last package or packages should be specially marked, since they contain the minimum quantity—the point at which a new order should be placed. Some offices provide a red card or sticker, which is placed under the string or tape of the package which marks that the minimum is reached, and reads somewhat as follows:

THIS IS THE LAST PACKAGE
MAKE REQUISITION FOR NEW SUPPLY BEFORE OPENING

As these cards can be used over and over again, there is little expense attached to the plan, which serves as an additional safety check.

No broken or partly unwrapped packages should be left on the shelves. Each new package opened should be completely

unwrapped and the wrapping destroyed, thus making for neatness in the stockroom. Packages received with broken wrappers should be used first, or, if there are too many of them, should be rewrapped.

The quantity contained in the package should be clearly marked on one end, and so placed that the mark is visible when the packages are piled. The packages should be piled in such a manner that the counting of the contents of any particular item is a simple process; that is, assuming that there are three piles of packages, and the limit of piling height is five—it would be incorrect to put five packages in one pile, three in the next, and two in the third. The correct method would be to form two piles of five each, leaving empty space for the third; a single glance would then give the count.

How Stock Should Be Issued

Stationery stock should be issued only upon written requisition in any office having more than a dozen persons.

This requisition should be signed only by specified persons, and otherwise not be honored.

The issue of stock should also take place at specified times only—for example, weekly. If issued at any time requested, the labor involved in handling will be excessive.

Stock should preferably be delivered to the person making the requisition, rather than that it should be called for.

How Consumption of Stationery Should Be Controlled

The control of stationery consumption can be secured by following the procedure given below:

1. By placing responsibility upon those who sign requisitions. Ordinarily these persons will be section or department heads, though in some few cases they may be clerks. Each such person to whom the privilege of signing requisitions is granted should be duly impressed with the responsibility attached thereto. He will, in consequence, carefully scrutinize each requisition he signs and will promptly change excessive orders.

2. By charging the cost of issued material to the department receiving it, and by a periodical auditing of these accounts. This does not involve any considerable extension of account-

ing methods or excessive clerical labor, but it provides a wholesome check upon extravagant use of material.

Where neither of these checks is maintained, and where stationery is issued at any time to any person requesting it, there will always be wastage, and in some cases excessive wastage. Clerks will order an excessive amount of supplies which will be stored in their desks; and it is not unusual to find in desks many dollars' worth of stationery which has become obsolete, but which might have been used when the forms were alive and active. Unnecessarily large quantities of pencils, erasers, and similar materials are often found in desks. If an inventory were taken of the stationery and office supplies in the desks of unstandardized offices, it would possibly be found that many hundreds of dollars of capital was being thus needlessly wasted or, at best, tied up.

Pins, Clips, Paper Fasteners, and so Forth

Pins, clips, staples, paper fasteners, eyelets, rubber bands, and other such small supplies are usually subject to great waste. A plan that has been successfully tried, to economize on their use, is to provide a supply of small envelopes, each containing a specified number of the above articles. When bands are requisitioned, let us say, the requisition will be for one or two envelopes of a particular kind. If desired, these envelopes can be printed with some such inscription as the following:

This envelope contains
50 RUBBER BANDS
which are provided in this
manner to caution you against
waste in their use.

The words "50 RUBBER BANDS" should be printed with a rubber stamp, as should the description of the contents of any other such envelope containing small supplies.

This method would prove wasteful, perhaps, except in a large office, but it has been demonstrated that the envelope package plan reduces the quantity of such small supplies issued.

Pencils

These should be used in the office wherever possible instead of pen and ink, as they are easier to write with and for most other

purposes are equally good. Cheaper paper may be used also. It has been demonstrated that the automatic pencil is an economy, even where the company supplies the holders, though it is well to set a price on them and charge employees for new ones at cost. The average wooden pencil is never completely used, and as a rule, not more than one-third of the lead in it is used, and of this a considerable amount is wasted in sharpening. Pencils are of varying degrees of hardness, and while it is not economy to use a very hard lead, it is more economical to use a medium hard than a very soft one and the work also is neater in appearance.

Fountain pens can also be used economically on many kinds of office entry work, as compared with the steel pen and inkwell. Wherever this is true, they should be furnished by the company, on the same basis as recommended above for automatic pencils. If the clerk is accustomed to the use of the hard accountants' pen point, the use of the blotter will be almost entirely avoided.

The Selection of Carbon Paper

To many purchasing agents, carbon paper is simply carbon paper—nothing more. As a consequence its selection is largely —sometimes exclusively—determined by its price. Nevertheless, every manufacturer of this material has a long list of kinds or grades, from which may be selected some particular kind or grade which will do the work required better than any other. All carbon paper is simply paper which has been coated with a colored material which will rub off upon a blank paper sheet when pressure is applied above, but with all this, there is considerable knowledge required in both making and using it. The factors in the use of carbon paper are as follows:

1. The method of making the impression.
2. The thickness of the paper written upon, and through which the pressure must be applied to the carbon sheet. This is a condition of great importance in manifolding.
3. The thickness of the carbon paper itself.
4. The suitability of the carbon coating for the purpose for which it is used.

Unless an office is well equipped to test carbon papers, it is best to select a reliable manufacturer of the article, and take the problem to him, specifying not only the carbon that is wanted,

but that a grade of paper is also required that will make a certain number of manifold copies on a particular kind of paper.

Typewriter Ribbons

These articles deserve equal care in their selection. The difference in wearing qualities of ribbons of different makes is considerable, and a wear-down test should be made of each kind offered by using a short section of each ribbon on the machine in the regular way, and keeping records of its life and behavior during the wearing out process. One quarter of a ribbon should last only one quarter of the time of a full ribbon, and in this manner the time element can be compressed.

Two-color ribbons have been very popular, but office managers are now discovering that when half the ribbon is black and the other half red, and the former is used a hundred times to once of the latter, the practice is not economical, for the black half is worn out long before the red.

Ink, Glue, Paste, and Mucilage

It is customary in some offices to have several different shades of writing ink, a particular shade representing the work done in a particular department. In some cases this is a commendable practice, but in connection therewith, it should be remembered that certain colors of ink are difficult to read under artificial light, so that, like color schemes, they should be used with caution and should always serve a sufficient and definite purpose.

The manufacture of ink has been so thoroughly standardized, that almost any standard make is satisfactory for use. Large users of ink can well afford to have laboratory tests made of the various makes of ink, before standardizing upon its purchase.

Paste, mucilage, and glue have considerable use in the office, but this use is always intermittent; therefore receptacles should be provided to prevent these supplies from drying out. Papers may be quickly attached at their edges by spreading some slow-drying paste upon a flat piece of slate or glass and tipping the edges with it, a practice that is much better than fastening with clips where the papers are to be filed and kept permanently together. The need for this process, however, is not general, and it should be used with caution, and only cases specifically ordered by the office manager, for papers once pasted together are not easily detached.

Controlling the Amount on Hand

A perpetual inventory of all stationery on hand should be kept; this amount can be verified by an actual account of each item in the following manner:

1. By an occasional count at an unspecified time and comparison with the card entry.
2. By a periodical—say, a quarterly—count.
3. By counting the material on hand when it has reached its low limit and an order to purchase is issued by the stock keeper.

Periodically, say, quarterly, the stock keeper should prepare a list of all inactive items and present a report, accompanied by samples, to the office manager, stating the last occasion when the item was used. This will enable the latter to check the ordering of new forms or new supplies of the inactive item, when those on hand can be continued in use, thus keeping the amount of "frozen assets" down to a minimum.

The maximum and minimum limits of each item should be standardized, and for this purpose the subject should be considered beforehand, such consideration not being sufficient at the time of first ordering the form. When the first reorder of the item is given, the subject should then be taken up again and reconsidered. It will then probably be found that the figures originally decided on as the amount to order (the maximum) were either too large or too small, or that the minimum allowed was too great or too little; or it may happen that in the meantime changes have taken place in the use of the form which will require that the order be increased, decreased or perhaps not given at all. In addition to this, an annual review of maximum and minimum limits will possibly be found of value.

Utilization of Obsolete Material

When a form becomes obsolete, its value is that of scrap paper, but, if an attempt is made to sell it, its scrap value is much less than that of the paper on which it is printed. Some office managers have these obsolete forms cut up into memorandum paper. In some cases, however, especially when forms are to be used wholly within the office, the reverse side can be used for other forms; this at least saves the cost of the paper. If this practice is followed, care should be taken to see that the obsolete form is

not confused with the new one, lest the slight saving in paper cost be offset by the delays in handling the routine of which the new form is a part. The nature of the obsolete form should also be considered: It would not be desirable, for instance, to have obsolete checks, or even old letterheads, floating about the office; the chances for misuse are too many.

Questions for Discussion

1. How much of a reduction is possible in the stationery costs of the average office?
2. Why is there usually a serious waste in the handling of office stationery?
3. Name seven elements of cost in handling office stationery and comment briefly on each.
4. Name four requirements of a satisfactory stock-keeping system and give your reasons for each requirement.
5. Name six factors in the problem of storing stationery and comment on each factor.
6. What four factors should be considered in determining where the stationery stockroom should be located?
7. What is meant by centralized stock keeping? What are its advantages and disadvantages?
8. How should stock be arranged? Why?
9. What is reserve stock, and how should it be handled?
10. What restrictions should be placed upon the issuance of stock?
11. Why is a requisition system for supplies advisable?
12. How may the consumption of stationery be controlled?
13. What results may be expected from the lack of such control?
14. How may small items, such as pins, clips, and rubber bands, be handled to advantage? What is the advantage of such handling?
15. Comment on the selection and use of pencils and fountain pens.
16. Why is there a problem in the selection of carbon paper?
17. Comment on the selection of typewriter ribbons.
18. Why are two-color typewriter ribbons not usually economical?

19. Comment on the selection and use of ink, glue, paste, mucilage.

20. How may the amount of stock on hand be controlled?

21. What is the purpose of keeping a perpetual inventory of all stationery on hand? Do you believe that purpose is a justifiable one? Why or why not?

22. How may a perpetual inventory plan be checked?

23. Should obsolete forms be destroyed? If so, why? If not, what should be done with them?

Problem

In the office of the National Graphite Company there are seven departments and 110 persons. In each department there is a supply cabinet from which clerks replenish their desk stocks. There is a central supply room on the floor below, the key to which is kept by the office manager. When additional supplies are needed, the office boy is sent to the storeroom for them.

Is there anything wrong with this arrangement? Explain.

XI

OFFICE DESKS AND DESK SYSTEMS

The primary purpose of a desk is to provide a suitable surface upon which writing on paper can be performed easily and expeditiously during a continued period of time. It must, besides, provide support for the arms or wrists in a writing position and also support the paper and writing materials in the most convenient manner for their proper use. Again it may be used as a support for a machine of some kind, as a typewriter, in such manner that the machine can be operated with speed and ease.

The secondary purpose is to furnish a storage place for such supplies as are needed by the person using it. It is also used as a storage repository for keeping records, reports, and sources of information with which the user works.

And finally it serves as a temporary storage place for the papers which are actually written upon its surface.

These being the obvious purposes of a desk, it follows that to be most effective it should be of proper height for the comfort of the person using it, and of a proper length and width.

The Factors of the Desk Problem

In the first place, an office desk should be of a size and design suitable to the operation that is to be performed on it. It is not sufficient to furnish a flat writing surface of reasonable hardness and of a standard height for all kinds of work, for not all office work is alike, nor are all office workers of the same stature. A desk or table should be adjustable so as to fit the physical characteristics of the worker, almost regardless of the nature of his work. It is folly to expect that a sorting clerk, a card-entry clerk, a bookkeeper, a comptometer operator, and an executive can each do his work in the best manner on working surfaces identically alike in every feature.

It is equally foolish to expect all office workers to use a desk of the same kind to equal advantage, though this does not mean

that there should be a different size for each worker. But it does mean that certain operations require a larger desk than others. The usual method of meeting this condition is to provide every clerk with a desk sufficiently large for the clerk who seems to require the most space.

The storage space should be of the right amount—too much is in reality worse than too little—and practically every desk on the market has three times as much storage space as is necessary for the average clerk, a condition which, while it costs the maker something for material and labor, is yet a constant annoyance to the office manager. Usually, only the most expensive desks are provided with special and adequate receptacles for pencils, pens, rubber bands, clips, and so forth, supplies which are constantly used by most office workers. The drawers of the ordinary office desk are not of dimensions that fit the standard sizes of papers used nowadays, and the middle drawer in most such desks is a veritable nuisance.

The desk or table should be of a size to fit the available space. It might be asserted that the reverse is true; the space should fit the desks; but the first statement is correct. Office work should be done in as small a space as is consistent with freedom of movement, for space in itself not only costs money but is the medium through which all work and workers must move, and moving any object through space costs money also.

The desk should be of good appearance, and most new desks are satisfactory in this respect. This feature is generally considered at the expense of other things at least equally important.

It should be so constructed that the floor underneath it can be readily cleaned. The modern so-called "sanitary" desk is one of the outstanding features in desk improvement, but there are still many of the other kind in use.

It should be easy to move. Many desks are so constructed that their frequent moving rapidly develops structural weakness; this is especially true of the larger types of desks.

The cost of the desk next demands attention. As a rule, office furniture is expensive, but this is mainly because it is generally purchased with little constructive, analytical thought. For most purposes an expensive desk is not necessary, and as a matter of fact there are few operations in the average office where a simple table would not be more satisfactory than a desk. If

tables are substituted for desks, where their use is practical, a great economy will result.

The cost of the space which the desk is to occupy is a very pressing factor in offices located in large cities, where perhaps the majority of offices are located.

Standardizing the Desk and Table

To find the best workbench for each type of work done in the office, it is of course first necessary to distinguish between these various types. Such distinction will naturally not follow the lines of the various operations but will deal with the various kinds of materials worked with or upon.

Writing at a desk is commonly done on three types of material: books, cards, and loose sheets. The desk worker who uses books may use them in either of two ways—he may consult them as reference books or he may make entries in them. In posting, he consults one book and makes entries in another, which obviously means that he must be provided with room for at least two.

A desk used by a clerk who writes upon cards need not be large so far as writing space is concerned, but it is usually more convenient to provide space upon it for the storage of the cards, as in the modern tub desk. To use a full-sized desk and a card cabinet besides, when writing upon cards is the only activity executed there, results in much waste of energy and reduction of output.

The desk used by clerks who write upon sheets of paper by hand usually requires space for incoming work and finished material as well as actual writing space, but beyond this, little other space is required.

When a desk is used as a support for a machine, the conditions naturally vary with the sort of machine it must accommodate. The use of an ordinary table as a support for a small calculating machine elevates the machine above the comfortable working position, unless there is a depression or tub arrangement in it. This improvement is to be found in modern tables used for this purpose.

With standardization of desks used for particular kinds of work, interchangeability will be possible, and this often proves a great advantage. If certain types of desks are all of one make and built so as to permit it, interchangeability of drawers will be found to be of considerable advantage at times. These remarks

also apply to any other kind of equipment which is extensively used for one kind of work.

A better and more harmonious appearance is easily obtained when desks are standardized. The arrangement is also facilitated, it being much more simple to obtain an economical layout than where desks are of all sorts and sizes.

How to Make the Preliminary Study

The office manager, in approaching the problem of standardization of desks and tables for use in his office, will first divide the various operations performed therein into types as previously outlined, and will then make a motion study of the work as it is being performed. In this study he should watch for any unnecessary motions which may have to be performed by the clerk, such as twisting, bending, reaching, stooping, getting up, or standing. He will observe carefully what supplies are most frequently used by the clerk, and where they are located; the location on the desk surface of the material worked upon, and whether or not it is a convenient working arrangement. As a result of these observations much valuable information will be gathered, not only as to the needs of the clerks, but as to the inefficient manner in which many of them work, even with the best of facilities, and he will finally see that the problem of providing the one best workbench for each type of operation is one that calls for considerable mental ingenuity.

Such a study will also disclose the fact that there are certain operations so different from the ordinary ones that they require specially built desks or tables. Special tables can often be designed to advantage for such work as sorting operations, mailing, parcel-post wrapping tables, and similar work which is usually a combination of duties.

The Studebaker Convertible Desk

In October, 1940, there was exhibited in New York a new desk designed by W. E. Tarr, General Office Manager, and Charles I. Center, Office Service Manager, of the Studebaker Corporation, for use in the company's offices. Because of the improved features of the desk, its manufacture and distribution have been undertaken by the Stow-Davis Furniture Company, Grand Rapids, Mich.

The four objectives which led to the development of this desk are:

1. Reduce space occupied by desks.
2. Develop desks readily adaptable to changing requirements.
3. Provide standardization with beauty of design and greater comfort for employees.
4. Reduce costs.

As a result of the research, the following features have been realized:

Starting with only two bases (one for a desk and the other for a table) and three sizes of tops, all of which fit on the standard-size bases, it is possible to provide three sizes of desks and tables by simply changing the tops. For equipping the desk base, there are available completely interchangeable units for desk drawers and typewriter platforms. With the above standard parts, a few minutes are all that is necessary to change the size of a desk or table top, completely rearrange or interchange all desk drawers, place the typewriter platform unit in any drawer position, or convert a secretarial or typist's desk from right to left or from left to right.

These completely interchangeable features make it necessary to carry only extra tops and extra typewriter platforms in surplus equipment stock, instead of complete desks, to meet changing conditions in either branch, factory, or home offices.

In line with the trend toward reducing the height of fixed-height desks, the Studebaker desk is 28½ inches high, which its designers believe is the most comfortable height for the greatest number of people.

Office Chairs

If the office manager will make a round of his office, paying particular attention to the postures of the clerks, he will note many signs of fatigue. If he especially notices the position of the feet he will find that many are entwined around the chair legs, and observing such clerks for a short period he will note that they twist about and change their positions constantly. He will find clerks humped over their work because either the chair or the desk is not the right height—perhaps both; clerks slumped down on their chairs, sitting on the base of their spines. All such

positions are not due to carelessness or slovenliness as regards posture, but are a direct result of defective seating.

The bent-wood chair, with round seat, is a very common office type yet is objectionable from almost every standpoint. The straight-back chair is also objectionable.

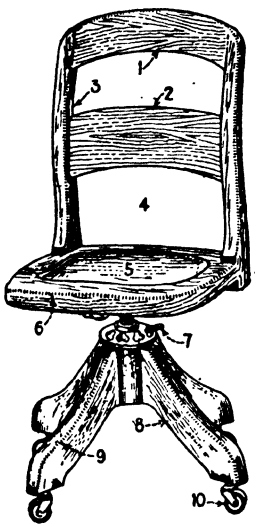


FIG. 13.—Leffingwell correct posture chair. Ten features: 1. Curved-top back rail—to fit the natural curves of the shoulders and to give them correct support in the correct posture; rounded corners and smoothly finished. 2. Adjustable back rest—gives firm support at the lumbar regions. The back rest is pivoted so that it moves with the body, giving a comfortable feeling of support at all times. 3. Adjustable range of back rest, 4 inches. This is sufficient for practically all variations in heights in people. 4. The space between the back rest and the seat is open, allowing the gluteal muscles freedom from obstruction and consequent discomfort. 5. Extra deep saddle-type seat—fits the form perfectly; so shaped that occupant automatically sits in correct and comfortable upright posture. 6. Rounded front edge of seat. There can be no under leg restriction of normal blood circulation. 7. Revolving and nontilting. By pulling out a small lock pin, the seat can be swiveled (raised or lowered) until the feet rest firmly on the floor. Then release the lock pin and the seat will revolve freely without changing its height. The pivot back rest compensates for the nontilting back. 8. The base legs are of one-piece construction, for maximum strength. 9. All edges and corners of the entire chair are rounded to provide utmost comfort and to eliminate blood restriction, as well as to prevent bruises to person and damage to clothing and shoes. 10. Easy rolling Atlasite (Bakelite) casters, 1⅝-inch diameter.

COMMON FAULTS OF CHAIRS

Office chairs are rarely adjustable as to height—at least those in common use by clerks are not. Their adjustment in that respect is equally important with that of a desk or table, and for the same reasons.

They would be more comfortable and far less fatiguing in most operations, if made so as to revolve, for many clerical operations require some twisting of the body, a movement that is accomplished with much less fatigue if the chair revolves partially.

Few office chairs support the back at more than a small number of points when the clerk sits upright.

The flat, hard seat is uncomfortable and the round seat of the bent-wood chair compresses the under part of the leg to the great discomfort of the sitter. The best form of seat is what is known as "the saddle seat."

While the subject of correct seating has received little attention in the past, it is now being gradually recognized as a matter of the highest importance in its demonstrated effect on the quantity and quality of output.

Desk Systems and Efficiency

The need for standardization of desk systems will be perceived when it is recognized that every minute motion used in the handling of office work has a bearing on the final result. It is this combination of motions in working that differentiates the good from the poor worker, the trained from the untrained, the efficient from the inefficient. If work is to be handled without waste of effort, standardization of desk systems is imperative.

It is needed to provide the proper location for all material which is at the moment not being worked upon or with; this includes all work in process, unfinished work, supplies, and data required to carry on the work.

It is needed to preserve order and enable the office manager to keep in touch with all work in process throughout the office; it will enable him to locate any particular piece of paper or other material wanted (no matter in what desk it is located) without waste of time, should the occupant of that desk be temporarily absent. All these things are of vital importance to the effective conduct of the business.

No Universal Desk System

Office managers have for years recognized the need of a remedy for such conditions, and many have been the attempts at a solution, all of which are in a certain sense attempts at standardization. Some few have solved the problem in a fairly satis-

factory manner, while others have endeavored to solve it by establishing one rule for all desk workers, a procedure which is manifestly wrong.

A clerk's desk system will certainly not suit an executive. The activities of the clerk are usually expended upon routine work which arrives at and leaves his desk with regularity. Whatever portion of it remains on his desk at the close of the working day is merely the work that came to it on that day and which time did not allow him to complete. The operations performed by a clerk on the surface of his desk are altogether different from those performed by an executive. The top of the latter's desk should be as free as possible from papers, and its interior will, besides supplies, contain only papers under consideration, with perhaps some data that are almost constantly used, and possibly a very small amount of unfinished work at certain times only.

A stenographer handling routine stenographic work will operate under entirely different work conditions from a secretary stenographer, who, besides writing letters, acts as an assistant to the executive, and who requires miscellaneous equipment and places for much special data.

In like manner, special clerks, such as bookkeeping-machine operators, file, mail-opening, sorting, and card-entry clerks, will require not only special supplies but special work conditions on the tops of the desks they use.

The Desk as a Work Place

Regarding the desk, then, as a work place, let us glance at the various conditions to be considered.

The top, or surface, of the desk is usually the place where the work is actually performed, and observation in an unstandardized office will show that in this connection there is very little system or order. Clerks will be observed making many false or wasted motions in searching for materials with which to work; they will be noted exerting much more effort on each cycle of operations than is necessary. Clerks handling books will have them located in most inconvenient places, and much unnecessary walking, twisting, stooping, bending, and stretching will be observed in every direction. On the other hand, some clerks may be noted who do not appear to be exerting any noticeable effort, yet who

are accomplishing as much as those who are constantly under a physical strain; closer observation, still, will usually discover that they are really accomplishing more.

The secret of this apparently perplexing difference will be found, upon analysis, not to reside in the work itself as a whole, but in its minute subdivisions. If the efficient worker is closely observed, it will be found that the tools and materials he uses constantly are always placed in the most accessible position for immediate grasping, while those less often required are in the next best location, and the objects that are seldom used will be relegated to the most remote places on the desk top.

The drawers of the desk or table are generally used for the accommodation of tools, materials, supplies, and equipment, and a study of the arrangement of these receptacles will invariably show a wide variation of conditions; very seldom will it be found that there is behind the arrangement of the contents any deliberate reason or thought, unless the worker happens to be exceptionally orderly and efficient.

Some General Helps for All Types of Desks

There are many devices and adjuncts which aid efficient desk work and which are applicable to most of the workers in an office.

The office possessing a messenger system will require at each desk a special place for "in" and "out" papers, that is, those coming to the desk by messenger, and those leaving it for some other destination.

Clerks who use a telephone should be provided with one of the several types of telephone holders or arms in order that the instrument, when not in use, may be lifted from the desk top, so that it does not occupy or interfere with the working space there. Some types of these holders are made so that one telephone can be used by two clerks, seated adjacent to each other. A calendar should be prominently displayed in every room, and desks in private offices should always be provided with desk calendars.

Convenient devices for holding memorandum sheets may be found useful in some cases. Some of these are provided with a small compartment for 3- by 5-inch guide cards in which are placed guides for the months, and figures running from 1 to 31, for the days. This device serves as a tickler system for memo-

randums which are not of sufficient importance for the central tickler system. The chief value of this arrangement, however, is that it provides not only a convenient place for storing small, blank memorandum slips but also a place for holding memorandums which have been written.

A small desk "work organizer" is frequently of value to many clerks and most executives. It consists merely of a collection of filing folders fastened together in such a manner that the guides are visible, and into which papers of various kinds can be sorted. There are various types of this device, and for those workers who receive a miscellaneous collection of papers, it provides a convenient method of keeping the papers separate.

Analysis of the Desk System Problem

The work of each different type of clerk or executive must be considered separately. It will not be necessary to study each worker in a group, let us say, of stenographers or bookkeepers, though after the type has been studied, ideas may be obtained by observing separate individuals among them.

In the study of the type, the first consideration is to determine in what respect the work of the employee selected as typical of the group is similar to the work of all the others composing it. It will usually be found that these similarities are few, but, however few they may be, they should be the first to receive careful study, for here we are dealing with a considerable number of clerks, and we can afford to spend more money for improvements which will affect a large number than for those which affect a smaller number.

Next comes the consideration of the manner in which the work of the particular clerk or executive being studied differs from that of others in the same group whose work is similar, a study which will indicate what will be required in the way of special equipment or system.

So as to be able to describe the operation in regard to the motions made, it will be unnecessary at this time to criticize the effectiveness of such motions.

The tools required for the work should then be listed, and the order and frequency with which they are used should be noted. In some cases it will be found—like, for example, the typist's eraser—that some tools are used more by some clerks than by

others, but such a condition should be figured for average instead of exceptional cases. Tools which are used in a certain order should be arranged in a convenient position, those most frequently used being placed most conveniently.

Then a list of the various supplies used should be made, and the order in which they are used and the frequency of their usage should be noted. For instance, a typist, in writing a letter, first selects a letterhead, then a carbon sheet, and then a sheet for the carbon copy and places them in the typewriter; sometimes a letter runs to two pages, and a second sheet will be required, but on the average the letterhead and the carbon copy sheet will be required more frequently than the second sheet. Again, at times, different letterheads must be used, and those most frequently used should naturally be placed in the most convenient position.

Different kinds of data stored and used for reference purposes should also be listed, and a note taken of the frequency of their use. A clerk checking for prices, terms, shipping directions, and so forth, will need a price list in a position where it can be instantly referred to, while the references needed for terms do not involve such frequent use, in ordinary cases, and only in exceptional cases will they have to be consulted, as in the usual procedure they are easily learned and remembered.

Finally a list of the different kinds of work done by each type of worker should be made, and the conditions under which they work noted.

The person making the survey will, if he has had some office experience, have made notes of a large number of conveniences that he knows of, but this should be supplemented by a study of office magazines, catalogues of makers, and a search through the establishments of stationery and office-equipment dealers. In many cases, improvements can be made without the purchase of any special equipment, merely by changing the arrangement; and where this is possible, it should of course be done.

After a survey of this kind has been completed, it will be possible to standardize, and put into effect, special desk arrangements and desk systems for special clerks and executives, and at the same time improve the working conditions of all employees.

A "desk directory" should then be prepared which will consist of a card list of the contents of the desk and their location. This

directory should also dictate a definite place in all desks where certain tools, materials, and supplies shall be stored. Its first section should contain a list of the articles or supplies common to all clerks or to a large number of them, and its second to the supplies, data, or kind of work peculiar to the type of worker.

A periodical inspection should be made by each department head to see that all desks are maintained in the prescribed condition of arrangement, and the results of such inspection should be reported to the office manager.

Such an analysis will uncover many weak spots and conditions in need of improvement, and standardization will make training more simple, the work will run more smoothly and many annoyances will be removed.

Desk Systems for Executives

The term "executive" is used somewhat loosely, to cover practically all persons that cannot be described as clerks, from the grade of section manager up to the general manager or chief executive, and naturally executives of different types will require different desk systems. As no attempt will be made here to differentiate, some of the remarks and suggestions given will not be equally applicable to all.

Unfortunately, too many persons in the executive class, especially those who have been promoted from clerical positions, retain the habit of performing detail work which is the work of a clerk rather than that of an executive. This work will not be considered here, and if those executives who persist in doing it cannot or will not break themselves of the habit, and still unconsciously act as clerks, the principles applicable to clerical work will naturally fit their case.

The desk top of every executive should be wholly—or at least largely—clear of papers not in immediate use, though a certain number of reference books may be stacked thereon if necessary. If a larger quantity of papers comes to the desk for approval or instructions than can be acted upon at once, space and equipment should be provided for sorting these out and keeping them in group order.

If the executive calls his own numbers on the telephone, it would be well to have one or more of the various types of telephone indexes, on which most frequently used numbers can be

written. If a general telephone directory is needed, a special position should be provided for it, arranged with regard to the frequency of its use.

Some executives reserve one desk drawer—usually the right-hand top drawer—exclusively for unfinished work, or papers that are to be held for a day or so. In no other part of the desk is current work ever placed; therefore it is always known that, if such work is wanted, it will be either in that drawer or not in the desk at all.

At times the work of an executive requires a special desk file, in which are placed reports and other data of a loose-leaf character needed in his work. This file should not be used for correspondence except in rare cases which are well understood.

Miscellaneous supplies, such as rubber bands, pins, clips, pencils, pens, rulers, and so forth, can be placed in the middle top drawer, if provision has been made for their reception by the desk manufacturer; if not, special compartments can be procured from dealers in office equipment.

Such supplies as are needed—as envelopes, letterheads, cards, and so forth—can be placed in the top left-hand drawer.

If a typewritten catalogue of the quantity of each kind of supplies that are supposed to be in the desk of each executive is located in some specified place in the desk, the task of keeping it supplied can be delegated to a junior clerk, or the private secretary of the executive, if he has one.

General Clerks

When the above-mentioned analysis is made it will show just what supplies and what arrangement of material, and work in process, should be prescribed for the various types of general clerks. In all desks, there should be a special place for current work, and this location should be standard throughout the office. The department head or office manager should have access to and knowledge of the location of all current papers at all times, and he should never be compelled to waste time in an extended search for them.

Every desk in the office, as well as the executive's desk, should have a desk directory, kept strictly up to date and located in a particular specified place in the desk.

Special Desks for Special Clerks

Mail-opening tables can often be specially devised for the particular needs of the work, with a minimum of construction, and will be found much better suited to the purpose than the common table. If mail is to be sorted into many divisions, this need should be provided for, and the provisions should be fixed, not movable. Pins, clips, cash envelopes, and the like should be located permanently in the most convenient places, so that not only is access to them easy, but the movement of reaching toward them becomes so habitual as to be practically automatic.

Special sorting tables may be devised which will speed up the sorting of some kinds of material, though the sorting devices mentioned in another chapter are often superior. In case such apparatus is used, however, a place will have to be provided for it.

Where much circularizing is to be done, a special table with a shelf in front on which the worker may pile finished work has been demonstrated to be of considerable value as a time and labor saver.

For the use of the calculating machines which are ordinarily placed on top of a desk, thus raising them above the convenient working height, special tub desks are available which allow the machine to be set in, thus bringing the keys of the machine to the correct working height.

Stenographers and Typists

The proper storage of the necessary supplies is here perhaps the most important element, and, as stated, these objects should be placed with relation to the frequency of their use.

Provision should be made on top of the desk for the finished and unfinished work. Notebook holders should be provided for stenographers, or one of the special adjustable copyholders which can be placed immediately behind the machine. These devices make the operation much less fatiguing.

Secretarial Desks

The stenographer who is also secretary to an executive will have some needs that require special consideration. In some cases a special desk is provided which satisfies these needs fairly well. In others a regular desk with a typewriter stand, either

separate or fastened to the desk, is provided; some of these types push back into the desk when work is over for the day. The secretary's desk will usually require a special place for data which are occasionally used by the superior.

It should also provide a definite location for work in process, unfinished work, and especially unfiled work. Nothing is more annoying to an executive, in the absence of his secretary, than to find he needs a particular paper which he remembers having given to his secretary, and then to be unable to locate it.

File Clerks

These workers need only a limited amount of supplies but on the other hand require considerable space for work in process. They also require special sorting equipment for sorting the material which is to be filed, into rough alphabetical arrangement.

It is particularly necessary in every filing department to have a specified place for unfiled material which will be available for immediate use. It frequently happens that an unfiled letter is wanted—in fact, the unfiled material is sometimes called for as often as that which is filed. Therefore, it should be established as a working rule, in every filing department, that as soon as papers are received they shall be roughly sorted alphabetically and put in some specified available space for quick reference in case they are needed, for much time is wasted in searching through a large pile of unsorted mail for a particular letter.

Questions for Discussion

1. What are the purposes of a desk? Which of these purposes are the most important? Why?
2. State several factors involved in the desk problem and comment on them briefly.
3. Comment on the three types of material commonly used in writing on a desk.
4. How may the problem of standardization of desks and tables be approached?
5. What features of the Studebaker convertible desk recommend its use in offices?
6. What are the reasons for the postures assumed by office clerks at desks? How may the situation be remedied?
7. What are other common faults of desk chairs?

8. Why do some desk workers appear to work more efficiently than others?

9. What is desk system, and why should desk systems be standardized?

10. Explain in detail how you would analyze the problem of desk system.

11. Should all desks have the same desk system? Why or why not?

12. What general efficiency helps would you suggest for all types of desks? Why?

13. Comment on desk systems for executives.

14. What papers should an executive keep in his desk?

15. What papers should an executive have on his desk?

16. How may the supplies for an executive's desk be kept replenished?

17. Comment on special desks for special clerks.

18. How should supplies in a typist's desk be stored? Why?

19. Comment on secretarial desks.

20. What special requirements do filing clerks have for storage of supplies?

21. Why should the department head or office manager have access to and knowledge of all current papers at all times?

22. Explain how this may be accomplished.

Problem

Assume that you have been assigned to the problem of furnishing the proposed new office of the Iroquois Knitting Company. How would you proceed to determine just what kind of furniture should be provided? What special features would you specify? Various and sundry details of the company will be found at the ends of Chaps. XIV, XV, and XVI.

XII

OFFICE MACHINERY

The ingenuity of inventors and the persistence of machinery salesmen have brought about a condition in which the present-day office manager is not asking himself whether or not his office needs a machine of some kind, but rather what machine he shall choose from among the multitude offered. The purchase of office machinery has in fact been dominated to some extent by the demands of fashion—the necessity of appearing modern and up to date—and there is no doubt whatever but that most offices now have more machinery than they actually need. It is, however, very doubtful if each such office has the right kind of machine in the right place.

As a generalization, machinery should be used wherever and whenever it will save labor. This, however, does not merely mean that a machine should do the work faster than it can be done by hand, for most machines will do this, but that it should actually save labor in the sense that such saving is manifest on a consideration of the pay roll. It is obviously easily possible to save time and still waste it afterward, and there is no profit in saving an hour of time through a machine operation and then permitting the clerk to waste that hour by stretching it over the remainder of her work, for in such case nothing is saved.

When a machine is purchased to save labor, the total pay-roll saving should be sufficient to pay for the machine in one year, even if the life of the machine is longer than that period, for either the operation or the machine itself may change or be superseded in that length of time. It should be remembered that the obsolescence factor on office machinery is very high because of the rapid improvement that is constantly being made in such machines. For this reason it is not at all unusual to find that either an operation or the use of a machine has been abandoned, and no other use for the machine can be found.

Machinery should be used wherever it is of importance to save time, and the value of some types of machines lies in that feature

alone. Where this is the case, it is necessary to place a valuation upon the time.

Again, machinery may be of special value in promoting accuracy, and on some types of office operations, accuracy is the feature specially desired. The machine gives a mechanical accuracy and saves much future labor time, and possible annoyance through error.

Finally, some operations are in their nature so monotonous as to constitute drudgery of a most distasteful kind to the clerk, and in these cases machinery has its special value in eliminating distasteful work, for it is well to remember that such work is rarely satisfactory either in quantity or in quality.

The above constitute the main reasons for the use of machinery. It should be borne in mind also that all money expended in the purchase of a machine is a capital investment in a very unstable asset, one which depreciates quickly in time, and very quickly in value. Therefore, idle office machinery is a real, though hidden, expense. The office manager who keeps his machinery earning money—and it can earn money only when it is busy—is saving, just as certainly as is a factory superintendent who does the same thing. In the factory, this matter is readily perceived to be of extreme importance, for when the machines there are not working, they are not producing goods, a condition which at once shows up in the output. But inasmuch as office operations do not show on the production records, or anywhere else, except as a burden, this idle capital invariably passes unnoticed, though it is exactly as real as in the former case. In one large office $25,000 worth of office machinery was found standing idle about 90 per cent of the time and depreciating greatly each month, though there was little or no realization of what the condition actually meant.

How to Determine What Machine to Buy

The first consideration in this question is whether or not a machine is needed for the particular operation in mind, and this can only be ascertained by obtaining a thorough knowledge of how the work is now being done. Before taking any steps toward the purchase of a machine, there should be a complete and exhaustive examination of this subject, the questions to be answered taking on somewhat of the following form:

Is the work now being done satisfactorily? If not, why?

Is it due to some defect in the workers, or is it inherent in the operation?

In what particular is it unsatisfactory?

Do the workers object to the work? If so, what is the objection? Is it a valid one?

What does the factor of time mean in this operation? Is it important to reduce the over-all time?

What does it cost to do the work now?

Can it be done more cheaply by hand, by improving the operation?

These questions being correctly answered, the next that arises is to determine what advantage is gained by having the work done by machinery. Will it save labor, time, or drudgery? On this point, certainty should be assured before going further. Having thus analyzed the need for a machine and decided that one is needed, the next important step is to find the right machine to do the work, and, to do this, it will be necessary to make an investigation of all machines available for such work, for there are, in most lines, competing machines. Some will be found which will do the work required and many other things besides, and, because of this additional utility, these machines will necessarily cost more than others which will not do so many things. And here it will be necessary to decide whether these added features can also be used. If not, the cheaper machine—if of equal quality otherwise—will of course be preferable.

Having decided on a certain number of machines to be taken into consideration, arrangements should be made for a scientific test to show their relative differences.

A scientific examination of the mechanical features is not usually practicable, unless, connected with the office organization, there is a mechanical engineer who can do this work, or access can be readily had to a testing laboratory. However, most machines have been designed by mechanical engineers, and as a consequence may be assumed to be correctly designed from the mechanical standpoint. To test the strength of the material used would also, under ordinary circumstances, be impracticable, unless the proposed purchase was sufficiently large to make it profitable to demolish one machine for this purpose.

A practical test of the machine in use, made in a scientific manner, is, however, within the reach of every office manager.

Duplicating Processes

There are numerous operations in office work which require the duplication or rewriting of some particular piece of work, and, as there are many ways of doing this and a number of machines on the market for such purpose, it will be worth while to consider this type of machine separately.

Aside from ordinary printing, the common methods of duplication in use in the office are as follows:

Carbon Method.—This is the most common method of making one to six copies, by the use of carbon paper placed between the sheets of paper before placing them in a typewriting machine. Good typed carbon copies depend upon the thinness of the copy paper, the quality of the carbon paper, and the touch of the operator. Special carbon paper may be obtained for use with pen, pencil, and certain machines. A hard-wax carbon paper gives the sharpest copies.

The blue-print method, though well known, is not so commonly used in the office. It is a semiphotographic process and requires a translucent sheet, upon one side of which is written the matter which is to be copied. It is then placed in a printing frame, in contact with a sheet of specially coated paper, is printed by exposure to sunlight or strong artificial light, and later developed by soaking in three or four changes of solution, and then dried. This method can be used only to copy material which is printed or written on one side of a sheet. It is very inexpensive.

The photocopying method actually takes a direct photograph of a record upon a photographic paper, without the use of plates, and it is not only replacing the blue-print method for office use but can be applied to many other uses besides—because it will enlarge or reduce—and matter on the opposite side does not affect the result. Very large offices often find constant use for this machine. Smaller offices can usually get this service from professional photocopying companies. Portable outfits have been developed recently which make size-for-size contact prints of any desired material.

The lithoprint is a photographic-lithographic process, which is little known in office work but has many uses. There are two methods, by one of which a print is made on flat steel by direct contact with a transparent or translucent copy, and the other by

which a photographic reduction is made of the copy on the steel. This reproduction is coated with a greasy ink, and the paper, which may be of any kind or thickness, is placed in contact with it and copies taken off. The basis of lithography is the well-known antagonism of grease and water. A chemically pure surface having been secured on some substance that has equal affinity for both grease and water, the parts to be printed are covered with an unctuous composition and the rest of the surface is moistened, so that, when a greasy ink roller is applied, the portion that is wet resists the grease and that in which an affinity for grease is present readily accepts it. From a surface thus treated, it is an easy matter to secure an impression on paper or other material by applying suitable pressure.

Photolithography.—The basis of photolithography is the fact that light on gelatine which has been impregnated with potassium bichromate causes that portion of the gelatine to become insoluble, and also incapable of absorbing water. A positive is printed from this negative upon a sheet of gelatinized paper, so prepared that the image, having been previously covered with greasy printer's ink, can be transferred to stone or zinc. The impression is developed by washing away the soluble matter with hot water, which leaves the ink on lines of the material to be copied. The advantage of photolithography is that the copy may be enlarged or reduced from the original.

There are firms in every large city which make a specialty of this work, which has many uses in the office. Recently there has been perfected a machine for doing this work in the office, with excellent results at reasonable cost.

Printing from type through inked ribbons is another form of duplication frequently used in office work. This same machine may be used to print with printers' ink and printing-type faces.

Duplicating from stencils of various sorts is also an old and well-known process, whereby a stencil is cut on a typewriter or by hand with a stylus and then run off on a machine which presses ink through the stencil onto the paper. The modern stencil is easily and quickly prepared, and up to several thousand copies may be printed in a relatively short time. Furthermore, the stencil may be preserved and used again at any desired subsequent time.

Duplication by the hectographic process consists of writing upon paper with water-soluble ink. When this master is placed on

either a gelatine or clay bed, the bed absorbs the ink, which may then be transferred to a clean, dry sheet of paper laid on the surface. There are several different types of hectographic process but the principle of all is the same. Both flat-bed and rotary machines are available for this process.

Duplication by the direct or spirit process is a relatively recent development, whereby copies are made direct from the master rather than through a medium such as the hectograph or stencil duplicator. The preparation of masters is very simple, and up to 500 copies may be quickly made under favorable conditions. The master may be preserved and used again, up to the limit of the stated number of copies.

Methods to Be Used for Different Types of Duplicating Work

Although many different types of duplicating work and many different methods for performing it exist in the office, it must not be supposed that each method is exclusively adapted to each kind of work. The various methods overlap each other somewhat, but, in a general way, each is adapted to certain kinds of work only.

For the duplication of sales form letters, the very best method is the automatic typewriter, when it is desired to give the letter the appearance of being typewritten. It is, of course, in fact, an actual typewritten letter and no deception of any kind is involved, any more than would be the case if a typist wrote each letter individually. The only difference is that a machine, instead of a typist, actuates the keys.

The next best form is the kind printed through a ribbon from type and matched by a typewritten address, though, as it is difficult to make an exact match, many users of this type of letter are abandoning any attempt to deceive and omit the address altogether from the letter. The result has then the appearance of a typewritten letter, but the recipient usually knows that it is not, though as it is in letter form he usually reads it with his other mail, and the desired result is accomplished. The exception to this, of course, is that type of customer who objects to receiving form sales letters on general principles, though he may be a large user of them in his own business. In the same manner the stencil duplicator may be used, though the

resulting copy is not always so neat as that printed from type through a ribbon.

Forms of various kinds may be duplicated by the type, stencil, hectograph, spirit, or photolithographic duplicator, according to their use or the quantity desired. Office instructions are more cheaply produced on the spirit or hectograph duplicator, although if an unusually large number of copies are required, the stencil method is to be preferred.

Bulletins may be produced by the type, stencil, hectograph, spirit, or photolithographic duplicators.

Charts and diagrams may be reproduced by the stencil, spirit, hectograph, or photolithographic process, according to the number required. If but a few copies are needed, or if they are to be reduced in size, the photocopying process is probably best.

Reports, of which but a few copies are needed, are best made on the hectograph or spirit duplicator.

Statistical tables, special articles from magazines, and matter which in general is difficult to copy can be best reproduced by the photocopying process.

Order and other routines, in which a number of copies of the same writing, on differently worded forms, are made, can be reproduced either by the carbon method or by the registering hectograph, according to the number of copies required. The carbon method is not recommended where more than six copies are to be made, as in such case especially thin paper must be used. Such copies are best made on the hectograph.

Machines for Adding and Calculating

There are three general types of adding machines.

1. *Listing Machines.*—This type comprises machines which make a printed record of the added items, which is a very valuable feature when it can be used as a control figure. This type of machine is also valuable in many bookkeeping operations.

2. *Nonlisting.*—Many types of addition do not require a list or a control figure, and in such cases the nonlisting machine is usually cheaper and serves the purpose equally well. Besides, for many types of calculation, this type of machine performs the work more rapidly than the listing machine.

3. *Computing.*—This is a nonlisting machine especially constructed for dealing at high speed with calculations of various types.

Calculating Machines

These machines will add, but they are usually constructed so that multiplication and division operations can be performed very speedily.

Multiplication, it may be observed, is but repeated addition.

Division, on the other hand, is but repeated subtraction.

Makers of calculating machines have worked out numerous and ingenious short cuts, which are usually explained in their instruction books.

Some calculating machines are electrically operated and perform multiplication or division very rapidly. On some models it is only necessary to set up the two factors of a multiplication or division problem, and the machine accomplishes the entire procedure thereafter automatically. While the machine is engaged in computing a multiplication, the operator may set up the next multiplier, and in division he may be writing down the quotient as it is produced.

Bookkeeping Machines

Strictly speaking, bookkeeping machines do not keep books, in the sense that a bookkeeper does. The bookkeeping machine is in reality a posting machine and is of the greatest value where the original entry is a sales slip, an invoice copy, a voucher, or some other single item, though it can of course be used for posting from the original journal entry if desired. In the last-named case it would be necessary to make the postings to two different accounts, the debit and the credit. As a rule, however, the machine is applied in cases where a control figure of some kind can be set up, and the individual postings made against this control.

There are three general types of bookkeeping machines. First, the combination typewriter, adding and subtracting machines, which allow the explanation of the entry to be written, in words (a very important feature of customers' statements), as well as perform the adding and subtracting operations on the entries. These fall into four subdivisions: (1) individual column registers, (2) individual column registers and a cross-computing register, (3) single main totalizer, and (4) duplex main totalizers. Second, adding and subtracting machines with either direct or comple-

mentary subtracting. Third, adding, subtracting, multiplying machines. Those machines which are capable of accumulating or subtracting amounts as they are posted at different positions across a form are called "cross computing" or "cross footing." Those which have individual registers to add or subtract amounts posted in vertical column formation are known as vertical computing.

An "old balance" is an amount appearing on the ledger as due to, or owing by, the company. In making a new posting, this old balance is "picked up" by putting it in the machine just as though it were to be added. Then the item to be posted is added or subtracted on the machine, according to the nature of the transaction. The result is a "new balance." The machine may print all these amounts on the ledger sheet, or only the debits, credits, and new balance, according to the machine used and the way it is set up.

The dual plan of posting consists of making the postings in one operation, and the statements to customers in another. When the statements, before being sent out, are compared with the ledger cards, it is assumed that any errors that have been made by posting to the wrong account will be discovered. While this assumption is undoubtedly correct, provided the comparing is carefully done, it is a matter of experience that such errors seldom occur, and the expense of making the duplicate posting is unnecessary.

The combined plan of making the posting and the statement in one operation is, in the majority of cases, the most economical, and as the daily proof of postings can be taken and the books kept in balance, the eventuality of posting to the wrong account can be disregarded.

In the operation of bookkeeping machines, it is customary—bank bookkeeping excepted—to run debits and credits in separate runs; that is, all debit postings will be made at one time, and all credit postings at another. It will be understood, of course, that in machine bookkeeping, but one entry—either a debit or credit—is ordinarily posted on the machine, the contra entry being a collective control figure. That is, all the sales tickets in a department store will be totaled, and this total credited in one posting, which gives the control figure; then the individual charges will be posted to the individual accounts, and the total

of these should equal the total sales to charge customers. The credits are handled in a similar manner.

Statistical Machinery

Statistical or tabulating machines are a combination of adding machines and sorting devices, the first of the type being invented for use in the United States Census Bureau. On the basis of this invention various other statistical machines have been produced.

The amount of work accomplished by these machines is so enormous as to appear marvelous, but the principle upon which they are based is exceedingly simple, being merely the perception that the preparation of statistics by hand involves but two operations, (1) sorting information into classes and (2) adding up the totals for each class. The old method of doing this work in the Census Bureau was to write the information on separate slips, which were afterward sorted into various classifications by hand. The inventor of the original statistical machine, Dr. Herman Hollerith, utilized the principle of the separate slip, replacing it with a card punched with holes. This card consists of 45 columns of figures, numbering from the top, from 0 to 9. The machine provides for 12 numbers, of which 10 are used for calculations, that figure being the base number of the decimal system employed. The two extra numbers are used for sorting. Certain groups of these columns are termed "fields," and a field may contain as many columns as desired within the limits of the card. These fields serve the double purpose of classification and the provision of the figures to be totaled. For the former purpose, the facts are represented by code numbers, and the numbers appear only on the card. Let us assume, for example, that one field, consisting of three columns of digits, is set aside for model numbers. When the machine is set to operate in this field, the first step is to sort the cards into the different model numbers, which is done by placing all the cards for all of the different model numbers in a promiscuously sorted pile in the machine, from which they are rapidly passed over a surface having a row of pins corresponding exactly with the number of spacings on the card. As the card passes, the pin corresponding with the hole punched in the card passes through the hole, and this operates a

mechanism which opens a gate, through which the card falls into a compartment corresponding to that particular gate. By running the cards through once, they are sorted into 10 divisions; by shifting the mechanism to the next column, they are again sorted into 10 divisions, and with the next shift to the third column, the third sorting will put all the cards in numerical order up to 999. If so desired, the machine can be arranged to pick out cards of one specified number in a field and sort all the remainder into a separate pile, a sorting operation that is performed at the almost lightning speed of 250 cards a minute—more than 4 cards a second.

When the cards have been sorted, the next operation is to tabulate the information, which is accomplished by putting the cards through another machine, and, in this, the punched holes actuate an adding-machine mechanism, which very quickly gives the totals in each class. The cards are fed into a hopper, as before, in lots of four or five hundred. The tabulating machines are made in varying sizes, those in general use having five different counters, capable of handling simultaneously 40 columns of figures on the cards, which pass through the tabulating machines at the rate of about 100 a minute.

The cards are punched daily, as the items occur, by a special punching machine, but they may be used for sorting or tabulating at any time and will pass through the machine an indefinite number of times without wearing out. In one type of punching machine, a small machine is used with 10 punches, each operated by one of the keys, numbered from 0 to 9 on the keyboard and an additional punch and key marked "X" for the purpose of skipping any given fields which are frequently omitted. The card is inserted in the rack and pushed to the right, until the first column of the desired field is directly under the punches. After a numeral has been punched, the machine automatically feeds the cards forward to the next column. These cards can be punched by an experienced operator at the rate of approximately 2,000 a day. "Gang" punches are provided for use where the figures of a certain field are repeated many times; with these 10 cards can be punched at one operation.

In another type of punching machine there is a keyboard with which all the information it is desired to punch on the card can be set up and checked before the latter is punched.

Some tabulators are equipped to print as well as to tabulate, and either each card can be printed or the subtotals of certain groups can be printed, on a large sheet, similar to the printing on an adding machine. There are two general types of tabulating machines; in one the cards are sorted mechanically, and in the other by electrical contacts. These statistical machines are usually rented, not sold outright.

They are especially adapted for cases in which there is a large amount of information to be handled daily. Where there is but a small amount, it is more economical to list the information on slips, then hand sort them, and take totals on a nonlisting calculating machine.

A projected development is the use of photographically sensitive marks instead of, or in addition to, the punched hole.

Addressing Machines

These are merely developments of duplicating machines, designed to duplicate a number of separate imprints once or twice, instead of the same imprint many times. They are of two general types (1) from stencils, fiber or tissue and (2) from type or plates. The first stencils were cut on paper with pin-point typewriters, the paper being later changed to wax and still later to dermatype tissue. The first addressing machines which printed from type used rubber type, which was later superseded by an embossed plate on thin metal.

These machines have a wide variety of application in office work. Their original use gave the name of "addressing," as they were used for imprinting names and addresses on magazine wrappers, or envelopes for circularizing.

In sales work, the addressing machine has not only been adapted for use in addressing the envelopes, but certain types are well adapted for filling in the name and address on form letters.

In some systems the addressing machine is used for imprinting other data than the name and address, such, for example, as the description of an article purchased, which can be imprinted on an invoice, and the entire invoice made on the addressing machine. This, of course, would only be in cases where the same item was repeated many times, as in mail-order specialty work. The same information may at the same time be imprinted on office records.

Shipping tags, labels, checks, time cards, pay envelopes, and so forth, can also be addressed.

Route sheets, pay rolls, and similar records can be quickly made on an addressing machine.

Heading up and dating statements, bills, and notices is still another application, and this work is often done in connection with a machine bookkeeping system.

Some types of these machines are equipped with selector devices which work either automatically or visually, by means of which certain addresses may be omitted in addressing a list. For example, if the entire list contains the names of wholesale and retail dealers, arranged alphabetically or geographically, either class may be addressed separately without disturbing the arrangement.

Folding Machines

Where there is a large amount of folding circulars to be done, machine folding will be found cheaper than hand work. If such work is only done occasionally it is best to arrange to have it done by a printer or other manufacturer equipped to do this sort of work. But if circularization is a regular office operation, it is more satisfactory to have a machine equipped for doing this work in the office. There are various types of folding machines on the market, some running as many as ten to twenty thousand folds an hour.

Stamp Affixers and Mailing Machines

Where there is but a small number of letters to be mailed they are usually stamped by hand, but for even small users it is sometimes economy to use the hand stamp affixer, which is a device carrying a roll of stamps which are moistened and affixed automatically by a downstroke of a plunger similar to the action of a self-inking rubber stamp. Some types—and these are to be preferred—are equipped with a counter which shows the number of stamps used. For handling large volumes of mail there are machines that seal the envelope and stamp it at one operation, and which work at a very high speed.

Many offices are now using sealing machines that, instead of stamps, print "indicia" in the upper right-hand corner of the envelope. These indicia are either metered or nonmetered. The

postage for metered mail is paid for in advance, by the use of a meter which is set by the post-office clerks to print any amount of postage desired. Nonmetered mail is paid for when it is taken to the post office; it cannot be deposited in letter boxes, as can metered mail. The indicia printing machine does away with the handling of large quantities of stamps, with the accompanying risk of theft and mutilation in the stamping machine. One additional advantage of this type of mailing machine is that the letters do not have to pass through the canceling operation in the post office, and time is therefore saved in the delivery.

Dictating Machines

Dictating and transcribing machines, though a thoroughly demonstrated success and on the market for years, are not yet so extensively used as they should be. Not the least of their many advantages is the fact that the time of the typist is saved when it is not necessary for her to sit beside the desk of the dictator, taking his dictation word by word. It is, however, perhaps not so generally recognized that much of the time supposedly occupied in taking shorthand notes is often spent in sitting idly by while the dictator composes his thoughts, talks over the telephone, or interviews a clerk, nor is it an entirely unknown occurrence for dictator and stenographer to engage in conversation entirely unconnected with the business in hand. Another advantage of the dictating machine is that with it the dictator may dictate at any time and almost any place; also the machine increases the capacity of the operator, because throughout the day, the load is more evenly divided. In addition, it is a well-known fact that the speed of the operator increases with good cylinders, because the dictator can—and should—dictate at conversational speed; conversation is much easier to understand when tonal inflections are heard, than when expressionless word signs are read.

An executive who travels a great deal may take his dictating machine with him and mail back the cylinders for transcription. Or he can arrange with the machine manufacturers to send a loan machine to his hotel in each city where they have a branch office.

An important development in the use of dictating-machine equipment is the Telecord, manufactured by the Dictaphone Corporation, and the Telediphone, manufactured by Thomas A.

Edison, Inc. These are devices by which both sides of a telephone conversation may be recorded on wax cylinders, which may be preserved for reproduction, or transcribed to provide a verbatim report on the conversation. There is no physical connection with the telephone instrument, which simply rests on a small flat panel; the recording is entirely automatic. The recording machine holds two cylinders; when one is filled, the other automatically switches in, leaving ample time for replacing the filled cylinder with a fresh one.

The use of a portable microphone with this device makes possible the permanent recording on wax cylinders of a conference of several people. Once placed in any location in the conference room, usually at one side, out of the way, the microphone is not moved; it picks up the conversation from all parts of the room. In a hall filled with people participating, it is necessary only to have a number of microphones strategically placed, in order to record everything that is said.

Some executives, instead of having the dictating machine at their desk, have simply the microphone. Their dictation is recorded on the machine at the desk of the secretary, who may be in another room. A logical application of this arrangement would be to have only microphones on the desks of all dictators and place the recording instruments in the central transcribing department.

Typewriters

There is one difficulty that confronts the office manager in regard to these instruments, and that is to decide what make of machine to standardize on. There is, of course, an advantage in standardizing, but few know how to go about it.

First, it may be taken as a fact that, mechanically speaking, there is little to choose between several of the best makes of typewriters now offered, and this being the case, the next best thing is to standardize on operators. A typewriter may, as a machine, be superexcellent, but, if the operators assume an antagonistic attitude toward it and will not use it except upon compulsion, that machine will soon become idle equipment. Of course, it would be folly to attempt to satisfy the personal preference of each operator—that would be the reverse of standardization—therefore, the machine to standardize on is the one that it is

most easy to get operators to work. A survey of the employment agencies, the schools, and business schools of a neighborhood will show which machine is being used most by operators, and, if the office manager will then choose this machine as a standard, he will find that the labor market is much easier.

Microfilm

For several years banks have been photographing checks on motion-picture film. As each check passes through the routine, it is photographed in miniature. By means of a special projector, the negative of any desired check may be examined full size, or larger, if need be.

The possibilities of microphotographing records and archives have been thoroughly explored and that work is now routine in many libraries and institutions, expedited by the dangers of war destruction. One of the advantages claimed is that the space required by the storage of reels of negatives is a mere fraction of that taken up by the original records.

Still further applications of the microfilm method have suggested the substitution of the negative for the ledger. This is accomplished by photographing the sales slip, invoice, or statement before mailing it to the customer. This is now the practice in a number of concerns.

Sorting Devices

To expedite the sorting of letters preliminary to filing, or of sales slips before posting, for example, many offices use a very effective device, which in its essential details is a set of tabbed, overlapping leaves or pockets on a sliding carriage. Sorting is very fast.

Another device for rapid sorting of cards, not requiring expensive equipment, is the keysort, by which cards are punched on the edges and a needle is used for sorting.

Pegboard

This device, a detachable metal strip with metal pegs extending across the top of a board, facilitates the rapid combination, comparison, and recapitulation of columns of figures by fanning or shingling strips of paper on the pegs in an overlapping manner, thus lining up any desired classifications side by side.

Questions for Discussion

1. "Most offices have more machinery than they actually need." Comment on this statement and the reasoning involved.
2. "In general, machinery should be used wherever and whenever it will save labor." Interpret this statement.
3. How much labor should a machine save? Why?
4. What else should a machine save besides labor?
5. Comment on idle machines.
6. What is the first consideration in determining whether to buy a machine for a particular operation? What facts should be obtained for such consideration?
7. What other points should be considered?
8. Comment on the desirability of a scientific examination of the mechanical features of a machine being considered.
9. Would you recommend the test of a machine under practical operating conditions? Why or why not?
10. List nine methods of duplication and describe each briefly, stating the advantages and disadvantages of each for office use.
11. What is the best method of duplicating sales form letters? Why?
12. Which kind of duplicating device is best for duplicating each of the following items: office forms, instructions, bulletins, charts, diagrams, reports, statistical tables, special articles from magazines, and multicopies of sales and production orders? Give your reason in each case.
13. What are the three general types of adding machines, and how do they differ from each other?
14. What is the difference between an adding machine and a calculating machine?
15. Comment briefly on calculating machines.
16. Describe briefly three general types of bookkeeping machines.
17. Do bookkeeping machines keep books? Explain.
18. How is a posting made on a bookkeeping machine?
19. What is the dual plan of posting, and why is it so called?
20. Is it feasible, in accounts receivable ledger bookkeeping, to make the customer's statement and the ledger posting in one operation? Why or why not?
21. What is a "run" in machine bookkeeping?

22. Why are debits and credits posted in separate runs? Illustrate your answer.

23. Explain the use of statistical machinery.

24. When should statistical machines be used? On what basis may they be obtained?

25. What work may be done on addressing machines, and how is it done?

26. What are the two types of addressing machines?

27. Describe some special features used with addressing machines.

28. Comment briefly on the use of folding machines in the office.

29. Comment on stamping and mailing machines.

30. What are the advantages of dictating and transcribing machines? Can you think of any disadvantages?

31. How may conferences be permanently recorded?

32. Comment on the standardization of typewriters.

33. What is the microfilm method of recording, and what are its advantages and disadvantages?

34. How may the sorting of papers be speeded up?

35. What is the advantage of using a pegboard in comparing or recapitulating columns of figures?

Problem I

What is the best method of making the duplicate copies required by the McLean Button Company (mentioned in the problem at the end of Chap. IX)?

Problem II

The following quotation is from *Social Work Administration* by Elwood Street, Harper & Brothers, New York, 1931.

Part of the problem of bookkeeping for a social agency which has to collect funds from subscribers is to keep an account of amounts due for the current year and from previous years, so that statements may be easily and correctly made out and credit for payment given promptly and accurately.

The system which is used by the Community Chest of Washington, D. C., may be helpful. Subscribers receive statements when payments are due, and each month thereafter until payments are made. The statement, which fits in an ordinary 6¾-inch envelope, is perforated

down the middle. To the right of the perforation is a coupon showing the amount of the subscription, the amount paid and the balance due; and this the subscriber is asked to keep as a record. On the left of it appear his name and address, and the amount of his payment. He is asked to return this part of the statement with his payment, but if he fails to do so, his name and address, verified if necessary by reference to his pledge card, are written out on a blank statement and attached to the payment. The statements and payments are arranged alphabetically by a check sorter which has a little partition for each letter of the alphabet, and the cash and statements are then separated. Each statement is placed in turn in a remittance register which records on the face of the statement, and on a sheet locked into the register, the serial number and the amount of the payment and the ledger to which it belongs. A deposit slip is made up from the payment by another employee than the one who recorded the statement on the register, and the total on this slip must agree with that recorded on the register; if it does not, they are carefully checked for the error. When they prove, the deposit slip and the cash are taken to the bank.

The files of addressing-machine plates, which also serve as ledger cards, are divided into four approximately equal parts with a typist in charge of each section; and she is reponsible for all the work in that section. Each of these section clerks posts, from her particular group of statements, the date and amount of payment to the subscribers' records, which are cards set in the upper halves of the addressing-machine plates. On the top of each plate is a "switch" tab, which is then turned to the "skip" position so that no bill will be sent until the next due date. As long as the skip tab is in its first or unpaid position, bills will be made from that plate each month. At the beginning of each quarterly billing period, all the skip tabs are turned back to the billing position so that the addressing machine will select all of them, imprint addresses on the bills, and fill in the amount of the subscription. If the subscriber does not pay for several months, the skip tab indicates this until payment is finally made. When the time comes for billing, those plates which show payments due are imprinted on bills printed in strips of six for speed in running through the addressing machine and typewriter. These strips of bills, together with the drawers of addressing-machine plates, are then given to the typist clerk responsible for that section of the plates and she types in the amount due. If a person owes more than one payment, the typist computes the amount of the total payment due and enters it in the proper place on the bill.

This method has been improved. How would you do it?

XIII

MACHINES FOR CALCULATION

As a rule, calculating machines are bought for one specific operation, and in many offices it is by no means uncommon to find them used for that one operation, and similar calculations performed by the mental-manual process, with pencil and paper, though if the machine is valuable in the one case it must be equally valuable in the other.

The most common form of calculation to be found in office work is addition, there being a number of operations where it is necessary. In some offices, however, the additions are so short and simple that it is ridiculous to use a machine for that purpose, unless there is a very large volume of such calculations.

The need for multiplication appears in all extension work and in many statistical operations.

Subtraction, as an isolated operation, is seldom needed and is not often performed by calculating machines.

In some offices, division is a frequently performed operation, while in others it is almost unknown.

In many calculating operations a combination of one or more of the above kinds will be found; thus, for example, subtraction is a very common operation in connection with bookkeeping machines.

The Preliminary Analysis

In all offices where calculation of any sort is used, a study should be made of all the operations into which it enters. This study should be complete and should cover the kind of computing done, its volume, and the extent of the difficulties occasioned by it. All this should be recorded, and, when the record is completed, the operations should be classified.

Consideration should next be given to the best method to use for each kind of calculation.

It must not be assumed that in every case calculation is more rapid by machine than by any other method, for in many cases this is by no means true. For example, tables of various

sorts often give the result of a calculation much more speedily than a machine, and slide rules may at times be found to give the desired result more quickly than either, and with much less effort besides. The cost is infinitesimal in comparison.

Having decided that a machine or machines are really necessary, it should next be determined how they are to be used; whether the work performed on them should be part of the duty of a clerk engaged on other operations connected with the calculation or should be functionalized, that is, made the sole duty of a single person or group of persons. Ordinarily, the usual practice is at first to make it part of the duty of a clerk performing other operations. That is, a clerk may be doing work which requires calculation only a part of the time, and, because it is perceived that a machine can do this work much more quickly, one is purchased regardless of the fact that it may stand idle the greater part of the day. Calculating machines are expensive, and it is neither good management nor profitable business to have the capital invested in them lying idle, as is the case in hundreds of offices. If an analysis is made and the facts obtained, the management will at least be aware of conditions.

General Principles for Use of Machines

Adding and listing machines are particularly useful where lengthy columns of figures must be added, and where such is necessary, this machine is always to be preferred. Short additions of two or three sets of figures can often be done mentally more quickly than by machine, especially if there is but little of such addition to be done at one time. The machine may also be profitably used where resultant figures are needed for checking the accuracy, or where they are wanted for future reference.

Billing machines are applicable where the typing and calculating can be done in one operation, as on bills, the machine taking its name from this fact. They may be used also, when it is necessary, for control purposes, to keep the totals arrived at; thus, the total sales figures will control the total of the volume of money represented on the invoices, and, in making this control, the bookkeeper may be certain that all invoices have been duly made. The machine, however, will not be profitable unless the volume of work is sufficient to keep an operator busy a reasonable portion of the time.

Bookkeeping machines should be used in all cases where the volume of work is sufficient to keep an operator busy, as one operator can make many more postings on a machine than a bookkeeper can by hand, and considerable other work besides the mere posting can be done at the same time. They should also be used when a statement and ledger posting can be made in one operation. When it is desired that the ledger shall show an itemized posting, the bookkeeping machine is advisable, and it should also be used wherever card or loose-leaf ledgers are permissible, always provided, of course, that the volume of work is sufficient to justify their use. When balances are frequently wanted, much time is saved by a bookkeeping machine, though in such case it is important that the accounts should be comparatively active.

Calculating machines can be used profitably on all calculations which cannot be performed as rapidly by the mental-manual method, or where the fatigue of continuous work of this sort is too great, for, while many calculations are perfectly simple to perform mentally, few clerks can work at them all day long without making errors, a fact which is a certain indication of fatigue. For accuracy, then, the machine is preferable, and where there are decimals and fractions in the calculation, it is much to be preferred to the mental-manual process. It can also be used for additions where it is not necessary for the figures added to be listed for control or checking purposes. Additions can be made twice on some types of nonlisting calculating machines, in less time than they can be set up on a listing machine, and, if the same answer is secured twice, it may be reasonably assumed that the right figures were put into the machine. Where there is division or subtraction following multiplication or addition, as there is in many calculations, the work is usually done more rapidly and accurately on this type of machine.

Automatic tabulating and sorting machines, though not strictly to be classed as calculating machinery, nevertheless perform somewhat similar operations. They should, however, never be used unless there is a sufficient volume of work to keep them reasonably busy, for they are a source of constant expense for rental. When two or more sortings are necessary, and when original records are repeatedly referred to for the compilation

of other groupings of information for statistical purposes, and this work is of sufficient volume the use of these machines is justifiable.

Calculating Tables

In many cases, simple tables of calculation can be substituted for machines to real advantage. No calculating machine can figure interest as rapidly as these figures can be transcribed from a modern interest table. Although these tables are in use in almost every office in the country, few office men have perceived the possibility of making other tables of calculations on the same principle, for other purposes, though such tables could be readily constructed. For instance, a company may handle a range of merchandise at regular prices, the number of which is limited, say, to one hundred different rates, the quantities usually bought varying from one to one gross. It would be a simple matter to construct a table showing all the different calculations that could possibly be used and place copies of the table on convenient cards. Using of such a table would be far more rapid than making the same calculations on a machine, and more accurate also. Such tables may also be employed where the variety of figures used is limited, as in pricing merchandise, making extensions, and figuring pay rolls, and where there are complicated decimals or fractions to be dealt with, for figuring percentage, discounts, premiums, and so forth. Tables are not necessarily limited to plain examples in multiplication—they can be used for division, or even for equations, provided they represent regular graduations and are constant in their nature. Engineers have for years used tables of various sorts in their work, and logarithmic tables have been used for centuries, yet few office men seem ever to have conceived of the possibilities for office use that are concealed in them. Before purchasing or using a calculating machine for any frequently repeated operation it might be profitable to consider the possibility of the use of a table for that purpose.

The Slide Rule

Another most valuable computing instrument, which is little used in offices but undoubtedly could be profitably used there, is

the slide rule. Among its various applications where rapid calculation is possible, and which are of everyday occurrence in the office, the following may be mentioned: estimating, discounts, simple and compound interest, converting feet into meters, pounds into kilograms, foreign money into United States currency, the taking of a series of discounts from list prices, and adding profits to costs.

Anyone who has a knowledge of decimal fractions can learn to use the slide rule, and the simplest operations can be learned in a few minutes.

With the 5-, 8-, or 10-inch slide rule, results can be obtained to two and three, and sometimes four, significant figures. Results are correct to four or five figures with the 20-inch rule, and to five or six figures with the Thatcher cylindrical slide rule.

Slide Rule for Office Use

There is a slide rule on the market especially adapted for the use of the business office, in which the scales for computation of square and cube roots, powers, sines, tangents, and other problems necessary for the engineer or technical man have been eliminated; in their stead, several scales have been added which simplify problems confined to multiplication and division.

The graduations on the slide rule are not measures of length but represent figures, and the beginner must first learn to read the graduations of scales accurately in terms of numbers.

Getting a Large Output

The preceding study will show the first requisite to securing a large output of calculating work—the proper equipment to be used. It is not likely that it will be possible to use one type of machine for all the various kinds of work, but it is probable that two or three will answer all purposes. With the proper equipment the rest is a matter of management.

The next step is to secure or train operators for these machines. There is usually considerable difficulty in getting trained operators, for as a rule these persons, merely because they are trained, will demand a higher wage than the work can afford, and in consequence most companies prefer to train their own operators.

If this training is given under the direction of the company manufacturing the machine, the cost will not be excessive. The difference between trained and untrained operators on this work is, as usual, very great, and almost equivalent to the difference between a typist using the touch system and another employing the "hunt-and-punch" method. Therefore, it is an unwarranted waste of time to purchase a machine without having a trained employee to operate it.

It is equally important that the output of these machines should be measured, daily work records kept, and weekly reports of the work done by each operator, submitted to the office manager. These comparative records not only are valuable as indicating the relative ability of the workers, but they also serve as control records concerning the amount of work to be done and enable the office manager to keep an even flow of the work.

The payment of bonus for a standard amount of this work is a valuable incentive to high output, and, wherever the work can be measured, this plan should be used.

The operators on this work should understand the calculations sufficiently to be able to perform them by the manual-mental process, for it is simply folly to place on one of these machines a young person who has forgotten most of her arithmetic, and who perhaps never was remarkably proficient in it. But a person who can do the same calculations with pencil and paper, and who has a liking for arithmetic, should, with the proper training, develop into a good operator.

As before mentioned, it is necessary that there should be a sufficient volume of this work to justify the use of the machine and keep it reasonably busy, and this is a necessity, whatever method may be selected. It is equally necessary to regulate the flow of the work so that the operator will have an even volume throughout the day. The reports referred to above will assist in securing this flow.

A Central Computing Section

Some companies have organized central computing sections equipped with all the necessary machinery and with expert operators, very much on the same plan on which central steno-

graphic or typing sections are formed. As before emphasized, a trained calculating-machine operator can do several times the work of an untrained one; therefore, it follows that, if it is at all possible, a grouping of these experts into a department is an economical procedure.

Such a central service section is, however, not advisable if it merely means that some work is taken away from other clerks and given to the section without at the same time making possible an arrangement of the work on a more economical or more effective basis. If, for example, a half hour of computing work performed daily by a clerk is transferred to the computing section, that half hour should be utilized in some manner that will advance the work of the department in which he is engaged, for, if it is not, nothing is gained by giving that clerk half an hour of leisure. In most cases, however, it will be possible to make a realignment of the work of a department, when its calculating work is given to the central service station, that will result in an eventual saving.

The analysis referred to in the opening remarks on this subject should furnish sufficient data to determine whether or not a central section would be economical, but in any case, it is certainly better to have a few well-trained operatives than a large number of untrained or partially trained ones, to say nothing of the saving in the number of machines.

The section, if established, should be located and under the control of the head of that department in which there is the largest amount of calculating work to be done. Thus, if the bookkeeping section has the greatest need of calculating machines of various sorts, the control of this special service work should be located there. In some large offices there will be a sufficient volume of work to keep a group of 15 to 20 operatives busy, and in such case the section would be sufficiently large to have its own supervisor.

To facilitate supervision, the work should be brought to the section whenever possible, but it is thoroughly feasible to send an operator from the section to another location, just as a stenographer is sent out to a correspondent to take dictation. In some cases where the nature of the work is such that it should not leave the room where it originated, it should then be handled as above described.

It should be organized with specialists—trained experts on a particular machine. That is, an expert on a key-operated calculating machine should not be expected to shift to a listing or bookkeeping machine; in other words, the work should be functionalized.

It is also necessary to keep an even and steady flow of work, otherwise there will be an amount of idle time sufficient to absorb most of the saving made.

While a calculating section can be of great service and accomplish much more work than an equal number of clerks scattered throughout the organization, there is also a danger that it may be loaded down with work that in itself represents no saving to the organization, and this condition should be carefully guarded against.

Questions for Discussion

1. Why are calculating machines helpful in office work?
2. Is machine calculation always more rapid than any other method? Explain.
3. How would you make a preliminary analysis of the calculating requirements of an office?
4. When should each of the various types of calculating machines be used?
5. Under what circumstances might calculating tables be more efficient than machines?
6. How could the slide rule be used to advantage in offices?
7. "It is an unwarranted waste of time to purchase a calculating machine without having a trained employee to operate it." Explain.
8. Is a knowledge of arithmetic necessary to the proper operation of a calculating machine? Why or why not?
9. How may the office manager control the output of calculating machines?
10. Comment fully on the organization, operation, and supervision of a central computing section.
11. "The work of a central computing section should be functionalized." What does this statement mean?
12. What possible danger is there in having a central computing section? How may the office manager guard against that danger?

Problem

The Old Colony Rope Company has 75 clerical employees and 50 calculating machines. Naturally these machines are not in constant use, but, when his attention was called to the matter, the office manager claimed that the interest at 6 per cent for 1 year on $500 was but $30, and that each worker saved more than $30 worth of time annually by the use of a calculating machine.

Is there a fallacy in this argument?

XIV

PROVIDING OFFICE SPACE

Although, in most cases, changing conditions in a locality are beyond the control of the designer of an office building, they are not always beyond the ability of a thoughtful planner to predict.

Mistakes in the actual design of a building, however, are almost always entirely avoidable by the owner, if he will but devote a sufficient amount of thought to the problem and insist that his requirements shall be met in the designing of the building. It has long been evident that many architects either cannot or will not design a factory building that is efficient, and modern factory buildings are now constructed by architects *and* engineers working in conjunction, the latter furnishing the technical knowledge so to plan the building that the various processes can be carried out with the smallest loss of energy. In like manner it is now being gradually recognized that the proper construction of an office building also requires technical knowledge of office procedure and office needs, and architects are either bringing in technical office experts to cooperate with them or having them thrust upon them by wise executives, who perceive that such special technical knowledge is indispensable to the erection of an effective office building.

Locating in an Office Building in a Large City

In the choice of an office location in a large city—where, as a matter of fact, most offices are—there are many adverse conditions encountered, some of which constitute obstacles that are utterly unsurmountable. As a rule, the space is very expensive and the tenant has to put up with many inconveniences which would be quite unusual in a small town, as is indicated later.

The general character of the neighborhood should be the first consideration, the factors of which will be enumerated later on. Daylight is not free in a large city; on the contrary, it is heavily capitalized, but no office manager should, on this account, choose a dark location, for while the rent is usually "all the traffic will

bear," it is rarely more. Office work means constant use of the eyes, and inefficiency due to poor light will cost more than the rent of the best-lighted office space. The next consideration should be the elevator service and other traffic conditions in and out of the building. There are many other desirable features, but these three are paramount and can usually be secured if the search is thorough.

Under ordinary circumstances it is not advisable for a small company to erect a building in a large city for its own use even if it owns the ground, for generally the lot is a narrow one, necessitating the erection of a narrow edifice—a most inefficient type for office work. In addition, all future expansion must be upward, and, unless the building is more than four stories high, the growth of the neighborhood will make the use of the space for a small building comparatively very expensive. If such an extremely narrow structure is higher than four stories, it becomes fit, in such case, only for small offices occupying not more than one floor, as the energy wasted in traveling up and down many stories is more expensive than the distinction of owning one's building is worth.

Providing for Expansion

Few companies give more than cursory attention and superficial thought to the probability of growth requiring more space for office purposes. It is true in most cases that when a new office is rented, a larger one than is needed is taken, to "allow for expansion," but usually there is little scientific reasoning devoted to this question.

Where space is scarce and rents high, providing for expansion is admittedly a difficult problem, but there are many ways in which it can be done, such as getting options on space as leases expire, or leasing more space than is needed at the time and subletting it on short leases. But many offices when first established have no data on which to base their probable growth, and usually there is little more than a hope that such growth will occur.

Assuming, however, an established company, with at least 10 years' business experience to use for purposes of study, estimate, and comparison, it should be possible to make a fairly accurate calculation as to the growth in the coming decade.

First, the growth of the company from its inception should be calculated and then charted, but in some unit more stable than the dollar. Pieces sold, or orders, would be more reliable. If these show a steady growth over a period of 10 years, it should be fair to assume—unless some variable factor intervened—that this growth would continue at about the same rate for the next 10 years.

Second, this chart should then be compared with one showing general business conditions, noting particularly whether the growth or lack of growth during the past few years was due to either a general expansion or depression.

Third, ascertain whether or not any particular policy in force now, or previously, might affect the curve of the growth. As an example, if a company stood practically still or had at most a very minor growth for five years, then a very successful policy of merchandising was put into effect, and in two years this company had grown more than ten times as much as it had in the previous five, in such case, if the average for the seven years were taken as an indication of future growth, it would in all probability be far less than the actual increase.

Fourth, take into consideration any particular period of prosperity, due to special conditions which may or may not be repeated.

If these factors are carefully and thoughtfully considered, a curve of probable growth can in most cases be charted with fairly accurate results for the majority of businesses. Many progressive houses constantly carry forward such charts of probable expansion as a general practice of preplanning.

The office manager, however, should remember that an increase of business does not always mean a proportionate increase of clerical help. Some departments expand in a direct ratio to the increase, while others will have but a slight growth or perhaps none. To determine correctly the amount of space needed for expansion, the ratio for each department should be figured separately and then the expansion for the establishment as a whole calculated.

In selecting a new office, expansion should definitely be allowed for during a period of five years. If the growth is expected to be rapid, and this would demand the renting of more space than at present needed, such space can be usually sublet (provided

this is arranged for in advance with the landlord) on short-time leases, expiring about the time it is calculated the space will be needed. If possible, options should be secured on additional space at the expiration of the first five years.

Factors of the Location Problem

In deciding upon a location, the following factors must of necessity be considered:

First, the suitability of the neighborhood. Each locality in a large city has particular characteristics, some desirable and others highly undesirable for a specified business. It is usually considered good business practice to locate in a neighborhood where there are others in the same line, but this procedure should not be followed slavishly or unthinkingly. If the general tendency of a certain line of business seems to be moving away from a particular neighborhood, it would be folly to move into it, even if that neighborhood had, at the time, the greatest number of firms in the line under consideration. Tendencies in the shifting of locations can sometimes be predicted long in advance through a study of traffic conditions or proposed lines of transportation. Again, the growth of a certain business in any particular section often threatens to burst through its boundaries in one or more directions. The changing conditions during the past 40 years in the business districts of New York, Chicago, Boston, and other large cities are striking examples of the need for great caution in this matter.

Second, the proximity to other departments of the business. The relative importance of being available to either (*a*) factory, (*b*) warehouse, (*c*) general public, salesmen, or customers, and (*d*) general salesroom is a problem that is never satisfactorily solved, when, in a large city, it is necessary to separate one from the other. To determine which department the office should be nearest requires more than mere executive decision. Record of actual contact should be made over a definite period of time, and careful study given to the question of relative importance.

Third, the labor market for clerks. It is not always possible to get adequate clerical help if the location is poor—yet an office cannot be successfully conducted without such help. In one such case, by no means exceptional, an office had been moved from a downtown location to the factory, the latter being in a

section where there were many other factories and the class of laborers in these factories were foreigners of a rather low grade of intelligence. For years this company has struggled along with the most inferior type of clerks, being able to keep only that type which was so inefficient that it could not hold jobs elsewhere. This condition constitutes a handicap that has seriously hampered the growth of that company to this day.

Fourth, the value of space. If an office is combined with another part of the business, the relative value of the space chosen for the office should be considered.

Fifth, the employees' entrance. In a large office building occupied by many tenants, this is seldom a factor, but it is occasionally a determining consideration. In another case, not so very long ago, the location of the office employees' entrance necessitated clerks' passing through a very undesirable neighborhood and this had a decided effect in increasing labor turnover. A change of the entrance to the other side of the building corrected this defect.

Disturbing Factors to Be Avoided

Owing to the peculiar character of clerical work and workers, there are a number of disturbing factors that, if possible, should be guarded against.

Street noises are very distracting, and for this reason, offices in the higher parts of the building are preferable.

Dirty locations caused by neglected streets and surroundings, or unusual volumes of smoke and soot deposits, should be avoided. Chemical fumes, unpleasant odors arising from numerous sources, and annoyances of a similar nature are very undesirable for office work.

Noise or vibration from factory machinery, above or adjacent to the office, are also disturbing conditions in office work.

Are Ventilating and Lighting Adequate?

That an office should be well ventilated is obvious, but many locations are of such character that adequate ventilation is difficult or impossible without special equipment. Low ceilings, few windows, or windows opening on narrow courts, or a location cut up into small rooms are certain to result in poor ventilation

as well as deficient light. In considering this subject, the condition of the outside atmosphere should be taken into account.

A building not over 40 feet wide, with light on two or more sides, gives very good natural daylight and ventilation, provided outside conditions are satisfactory, but if possible a building with an eastern or southern exposure should be avoided on account of the excessive glare of the sunlight in summer time.

Buildings with small windows should be avoided. One in which the windows occupy 75 per cent of the surface of the outside wall is ideal, though not too often found in office buildings. The old-fashioned type of building, in which only about 30 per cent of the wall surface is given to windows, is very expensive, no matter how cheap the rent.

If artificial lighting must be used for a considerable period each day, it should be ascertained whether or not there is sufficient wire to carry the current required to give an evenly diffused light of an intensity of at least 20 foot-candles.

Shape and Size of Space

In deciding upon the size of space, the actual area in square feet is not the only consideration. Rectangular spaces of large areas are much better for general office purposes than a number of smaller rectangular spaces. Long, narrow spaces are undesirable, if much walking back and forth is required, and this also applies to space of similar shape around a court or well in the center, if the office is to occupy the entire floor. Large offices should, if possible, endeavor to accommodate their force on one floor, though, of course, this choice is limited, and an office requiring 40,000 square feet would ordinarily be much better accommodated on two floors than on one. The deciding factor here should be the necessity for contiguity of departments. It is much more economical to travel 15 feet up or down stairs than to travel 200 feet on a level.

Telephone and Buzzer Conduits

In the construction of every new building for office purposes, provision should be made in advance for floor conduits for telephone, buzzer, and annunciator wires. The local telephone company will usually provide detailed plans.

Cloakrooms and Restrooms

Adequate provision should always be made for the proper storage of the wraps of employees. The customary practice is to place costumers around the room, which is not only unsightly, but the garments when wet—as at times they will be—give off an unpleasant odor. The practice is also wasteful of space. In some offices, individual lockers are provided, but these are unduly expensive, and also wasteful of space, for they require 3 square feet for each person, allowing for the standing room in front of the locker. A better plan is to have an enclosed, well-ventilated room, provided with hangers, racks for hats, and a place for overshoes, rubbers, and umbrellas. In some large offices, checking rooms, with attendants, are provided.

Rest rooms for women are a requirement in some states and are an advantage everywhere, as they improve the morale of the organization. These rooms should have a homelike appearance, with easy chairs and cots, and a separate room with a cot should be provided, where, in case of necessity, a person can lie down and sleep without disturbance.

But while rest rooms are an acknowledged advantage for women, some few office managers have discovered that they are of equal advantage for the so-called sterner sex. Where smoking is not permitted in the office and where there are a number of men employed, a room where they may at times retire for a smoke is a decided advantage. In an office where smoking is not allowed, the smell of smoke can usually be detected in hallways and toilet rooms, an indication that the clerks appropriate time for a smoke notwithstanding the prohibition. It would be much better freely to allot them a comfortable room where they can indulge openly, for a secret violation of office rules always impairs the morale of the organization, and it is probable that no more time would be consumed in smoking in such a room than is used in the semisecret places mentioned. It appears both illogical and exasperating that executives may smoke in an office while others are forbidden the practice.

The Private-office Problem

The genesis of the private office lies in the fact that it has been long recognized that there are certain types of work which require privacy, and certain individuals who desire it.

It enables some persons to concentrate their thinking, who without such privacy would be utterly unable to do so. But it must not be assumed, however, that all persons require solitude and quiet in order to concentrate, for it is an actual fact that many persons cannot do so when segregated from the sight and hearing of other workers; and again there are many individuals who, under any conditions, possess this ability. Of course, under all conditions there must be physical ease—reasonable bodily comfort—and the private office by no means guarantees this. But for the executive who must have privacy to concentrate and develop the thinking that is vital to the interests of the business, the private office is a necessity.

It has the advantage of preventing the distraction of the attention of the office workers, and, while this is usually of minor importance, in some cases it is otherwise. If there are a considerable number of visitors who are loud of speech or who must enter or pass through the open office at frequent intervals, a private office in which they can be received is undoubtedly an advantage.

Finally, the private office bestows a certain dignity and distinction upon the position of the occupant, and this must on the whole be considered an advantage also.

In this connection the question is a serious one for any company, as it involves both the position and the occupant, and it is not possible distinctly to separate the dignity and distinction of the position from that of the person occupying it. It is not always easy to decide what positions or persons in an organization are entitled to such distinction, but in all cases it is best to make the decisions as impersonal as possible, so that the position rather than the person is considered. If a sharp line is not drawn on this subject, it is certain to occasion much jealousy and consequent loss of office morale.

The foregoing considerations fairly sum up all the advantages that may be attributed to the private office, but much can be said upon the other side of the question.

DISADVANTAGES OF THE PRIVATE OFFICE

The necessity for privacy as a factor in the conduct of modern business is frequently overstressed, for into this question human desires and ambitions and personal prestige project themselves,

and it is exceedingly difficult to separate them from its purely utilitarian aspect. The tendency, however, is in this direction. The modern metropolitan bank has already almost abandoned private offices, and major executives are located in the open on an officers' platform. Granting privacy to individuals who do not need it is not only a wasteful practice in office arrangement but actually lowers the general effectiveness of such individuals.

It is to be understood that the criticisms which follow here apply only to private offices which are erected in a room already built. It is obvious that in buildings erected by and specially designed for a company, the private offices provided are not necessarily subject to the disadvantages enumerated here but can be designed so as to avoid them, either entirely or in great part.

The private office complicates the ventilation problem to some extent. Usually the only ventilation of such enclosed spaces is afforded by the open windows, which are kept open in hot, but usually closed in cold, weather, when ventilation practically ceases. Under such circumstances concentrated thinking is rendered difficult, and the private office thus defeats its own purpose. The condition described can only be corrected by installing a separate ventilating system for the room.

The private office is difficult to light properly, as the standard lighting arrangement usually provided for an open room or general office space is frequently found to be in the wrong position for illuminating an enclosed room taken from this space. This condition necessitates rewiring and rearrangement of lights.

It is generally difficult to heat, for usually the heating equipment designed for a large room is not suitable for a small enclosure in that room. Radiators may be absent altogether and if present are generally of such size and volume that they furnish far more heat than is necessary to the limited space. The condition can of course be corrected by the installation of new radiators adapted to the size of the room.

From the above it follows that the private office interferes to some extent with the light, heat, and ventilation of the general office, and in many cases this interference may assume the proportions of a serious defect.

Other disadvantages are that it wastes space, interferes with flow of work and traffic, and makes supervision more difficult.

In some cases these interferences are of minor character but in others they may be defects. It may be added also that some of them are not possible of correction.

The private office costs money to build and equip, and the changing of partitions in an office for this purpose is usually an expensive proposition, for the decision to have such offices nearly always entails the complete rearrangement of the floor space. It may be noted also that the private offices usually require a much more expensive equipment in the matter of furniture than would be required where the occupant is located in the general office. Extra expensive desks, chairs, bookcases, rugs, pictures, and so forth, are usually procured for this purpose. It is also in most cases necessary to provide extra means of communication, such as telephones, buzzer systems for these spaces, and in addition much time is certain to be wasted by clerks, messengers, and others who are sent to see whether the occupant is or is not in his private office. After an office has been carefully planned, the addition of such enclosed spaces rarely makes the plan more harmonious, but usually detracts from the appearance and effectiveness of the entire office by taking light and air from clerks who need it more.

These numerous disadvantages are the cause of the general tendency to reaction against the private office on the part of the most modern companies, for on the whole they are undoubtedly greater than the advantages derived.

The need for private offices can be greatly decreased if the company will provide an adequate number of conference rooms which can be used by those executives who occasionally have a real need of a private compartment. This occasional use will enable several executives to be served by the same enclosure.

It now remains to discuss the question of the kind of positions for which private offices *may* be advisable, despite the disadvantages enumerated.

WHERE PRIVATE OFFICES MAY BE ADVISABLE

Major executives, such as the president, secretary, treasurer, general manager, sales manager, production manager, and so forth, hold positions for which private offices may be advisable. Such positions may be assumed to have need of privacy, concentration, avoidance of distraction to others, and dignity and

distinction. In such cases it is usually advisable to provide private offices, though in many modern offices, at present, even these officials are of their own accord deciding to locate in the open office. This is especially true of banks.

Executives or other persons may do work the nature of which requires privacy. These may or may not be high-salaried employees, the nature of the work determining the need. Such work may require the handling of large sums of money or securities of great value, or it may be work of a highly confidential character. Positions which involve work of this kind need only privacy, which in many cases can be obtained by having a conference, or other, room which may be used in special cases by a number of different people. A private room or office for this purpose need not be large, nor does it especially require daylight, though, of course, light may be given if thereby others are not deprived of it.

Persons who have frequent visitors from outside the office usually need such accommodation. Numerous callers, entering the office at all hours of the day, usually disturb the clerks on the general routine work, and especially so if they are given to loud talking. Such persons need a place where the distraction of office attention will be avoided. Such a room does not especially require daylight, and it need be no larger than will accommodate the average number of visitors expected at one time, but it should be soundproof to a sufficient degree.

Persons whose work necessitates an unusual amount of concentration, and whose temperament demands privacy for such work, will need a private room where they can concentrate. Persons who are expected to do creative work, and who need privacy for that purpose, should be similarly provided. The lighting of such an office should be good, though daylight is not indispensable, and the room, though not necessarily large, should be soundproof in a degree varying according to the nature of the work.

LOCATION AND CONSTRUCTION OF PRIVATE OFFICES

A private office may be located alongside a window and occupy space equally divided between windows and adjoining rooms.

It may be located within the general office and away from a window, but in such case it will be dependent upon artificial light. In making a decision to allot an inside office away from a window, the efficiency of the occupant should be compared with that of the number of people in the general office who would be deprived, or partly deprived, of light by the construction of such office. In these cases, the partitions should not be extended to the ceiling on account of the factor of ventilation.

A private office may be located in some natural alcove or "ell," or side room off the general office, and in this case its location will discommode no one.

Yet again, it may be located alongside windows in a separate part of the office, so as not to interfere with the light required by the clerical workers, or the private offices may be on one floor and the clerical workers on another, but this arrangement is, in many cases, wasteful of space and in all cases is wasteful of time and energy.

Private offices may be constructed of various materials. Tile and plaster is more or less permanent construction and is more expensive than other kinds and largely soundproof, but it requires interior ventilation.

A private office constructed of glass and wood or steel is comparatively cheap to erect, because it may be bought in standard sections. It can also be constructed so as to allow a certain amount of ventilation but is not soundproof, for in a quiet office, conversations within such a room can be readily heard outside it. If clear glass is used, the passage of some light is admitted. Florentine glass admits still less, but either kind prevents 50 per cent or more of the light from passing into the general office.

Solid wood construction is very expensive, as when paneled with costly veneers; or very cheap, as when ceiling lumber is used. Ventilation can be partially obtained by means of transoms, but this construction is not soundproof.

The Reception Room

The reception room, or public entrance to an office, is a feature of vital importance, for it is there that the visitor gets his first impression of the establishment, and first impressions often determine future action and, in practically all cases, have at least a certain bearing upon it.

As to size, it should be sufficiently spacious to accommodate the largest number of callers who are likely to enter it at any one time. When this number has been estimated, multiply it by 10, which will give in square feet the minimum area to be allowed. When the maximum number of callers are present, the room will be somewhat crowded, but this will only happen occasionally, and at other times there will be ample room. If the office is small and there are but few visitors, this rule of course does not apply.

A minimum allowance of 50 square feet should be made and then the allowance for visitors added.

The reception room should be easily discoverable by callers. This may appear very obvious, but in many cases such rooms are not readily distinguishable.

It should also be placed so that from it the visitor cannot see the main office. This precaution will prevent interruption of the work, as the attention of the clerks is often distracted by the entrance of a caller who is visible to them. It also serves to keep unduly bold visitors from rushing past the reception clerk into the main office, the nature of their business being unknown. In this connection, the location of the reception clerk should be such that he will be immediately visible to the caller who enters the room.

It is a commendable practice in most cases to supply reading matter for the visitors who may have to wait in the reception room until those upon whom they call are ready to receive them. The selection of this matter is a question for the judgment of the management. As it may be reasonably assumed that many, if not most, of the callers are interested in some product or service of the company, it is usually customary to provide some literature on these subjects, the best and most attractive being naturally the wisest choice. A few current magazines and miscellaneous reading matter of other kinds, selected as interesting to the majority of readers, may be introduced to vary the collection. Naturally no specific rule can be given for this selection, the management being the best judge of its customer's tastes in these matters.

The lighting of the reception room next demands consideration. Inasmuch as there is little work done there, daylight is of no particular importance, though it is important that there should

be sufficient light to suggest to the caller that the office is open for business. Naturally, where reading matter is provided, the light should be sufficient to enable the caller to read comfortably while waiting. Some reception rooms are designed with a lighting arrangement intended to produce some particular impression. If it is, for example, desired to create a homelike environment, subdued lighting would be used; if there is, as in some cases, an illuminated show window in the reception room, in which merchandise is displayed, the light in the rest of the room should be subordinated to attract attention to the show window.

Finally the reception room should, if possible, be located contiguous to the private offices where the visitors are most likely to be directed; in other words the visitor should be able to reach these offices with the least possible travel through the general office.

Questions for Discussion

1. Why does the proper location and construction of an office building require technical knowledge of office procedure and office needs?
2. What are some of the comparative advantages and disadvantages of locating the office either in a small town or a large city?
3. Is it advisable for a small company to erect an office building for its own use in a large city? Why or why not?
4. Why is it inadvisable to erect any office building on a narrow city lot?
5. Before selecting office space, what data should be secured in order to furnish a basis for provision for expansion?
6. "An increase in business does not always mean a proportionate increase in clerical help." Explain.
7. How long a period should expansion be definitely allowed for? Why?
8. In selecting a location, what five factors should be considered, in the order of importance? Comment on each.
9. What disturbing factors should be avoided or guarded against?
10. Comment on desirable lighting and ventilation facilities in renting office space.
11. What is the ideal window space on the outside wall?

12. Who should have daylight, if there is a choice?
13. How far does direct daylight penetrate a window?
14. Comment on the factors affecting the size and shape of the office space.
15. Is it better to locate a large office on one floor? Why or why not? What factors might influence the decision?
16. Where should electrically operated machines be placed? Why?
17. In constructing a new office building, what provision should be made for electric wires?
18. What provision should be made for the proper storage of employees' wraps?
19. Comment on rest rooms.
20. Comment fully on the private-office problem and what may be done about it.
21. Why are private offices undesirable?
22. When is a private office advisable?
23. Where should necessary private offices be located?
24. What is the best construction for private offices? Why?
25. Comment on the location, size, lighting, arrangement, and administration of the reception room.

Problem

The Iroquois Knitting Company has allowed its office organization to become antiquated. More than 200 clerks are employed, but these are scattered so that no more than 30 are in any one place. Clerks are to be found in each one of the company's six mills. Working conditions are bad and proper supervision impossible. The management now recognizes that something must be done about it. They feel that they cannot afford to erect an administration building, but they can assign (approximately) 24,000 square feet (two floors) in a fireproof concrete building that was formerly used by one of their manufacturing departments. The sides of this building are practically all windows. Dimensions of each floor, 60 by 200 feet. The floors and ceiling are of monolithic concrete construction, and bays are 20 by 20 feet. There is a woodworking shop on the floor below. The building runs east and west. There are 6 executives and 12 department supervisors.

Is this place suitable for office work? If not, what are its chief disadvantages?

If you were asked to centralize the office in this building, what alterations would you suggest to convert it into a modern office? Give reason and justification for each recommendation, for the company cannot afford to spend money for frills.

How many private offices would you supply, and why? What other partitions would you erect?

XV

WORKING CONDITIONS

The arts of lighting, heating, and ventilating have made tremendous strides during the past decade, but this progress has been many times temporarily halted because scientific research has shown that much that passes current for "knowledge" on these subjects is faulty. In these three lines, most particularly, the office manager should make certain in consulting authorities that the information is of the most recent date and the authority reliable. All treatises on these subjects which are 10 years old or over are practically out of date.

Importance of Light in Office Work

Naturally no office work whatever can be done without light, though much is done with insufficient light, the main reason for this neglect of such an important matter being that no one, even today, can say definitely and scientifically what is a sufficient amount of light. The normal human eye is a curiously adaptable organ; it can see to read with 0.05 foot-candle, though not, of course, without a certain amount of eyestrain, or it can read without strain when there are a thousand or more foot-candles of daylight. But just where, within this enormous range, is to be found the ideal light for office work, has not as yet been determined.

Modern factory design demands a building of which the sides are practically all window surface, for it has been definitely determined that this practice pays in increased production, despite the fact that the increased radiation of heat caused by such vast glass surfaces costs money also. Yet, though most office work is more exacting in relation to light than factory work, even the most modern office buildings are not nearly so well supplied with natural daylight as the modern factory building.

Office buildings are, as is well known, often located where, owing to crowded conditions, it is very difficult to provide natural

daylight, yet these very conditions are caused by the fact that there is a pressing demand for space in such neighborhoods. The skyscraper apparently breeds other skyscrapers until the saturation point of traffic facilities is reached, and the office manager who seeks a location in an office building already erected in one of these crowded metropolitan areas must do the best possible with what conditions are offered.

Small windows in office buildings have been the general rule until recent years, but today, much larger windows, and more of them, are being fitted in these structures. The highest types of such buildings now have about three-quarters of the linear space of a wall, and about three-quarters of the height of the room devoted to windows.

When one- or two-story office buildings are erected they are sometimes equipped with the typical "saw-tooth" roof of the factory building with windows in the vertical part of the "tooth," a practice which allows a much greater interior width of office floor.

Daylight will not penetrate in sufficient volume beyond more than 25 or 30 feet, and therefore the ideal width of an office building, with windows on both sides, would be from 40 to 60 feet. Such a building should have sufficient light to make work by daylight possible on every portion of the floor space throughout most of the year. The general shape of the structure will of course determine, to a greater or lesser extent, the daylighting conditions. If the building is a huge square, of, say, 100 feet or more on a side, the center space on each floor will always require artificial light.

In some locations during certain seasons and hours of the day, the sunlight causes excessive glare, a condition which is usually corrected by the use of green or some other dark window shades; but this practice cuts down the volume of light so considerably that those working 10 or 15 feet away from the windows must supplement the reduced volume with artificial light. A much better method is to use one or other of the venetian blinds on the market which are so designed as to diffuse the light by projecting it to the ceiling. They are constructed so that the slats of the blind slant upward from the window, their upper sides being painted white, so that the sunlight is thus reflected directly upward and reflected in turn from the ceiling, with the result

that the entire room is flooded with a soft diffused light. With this type of blind, the strongest sunlight can be utilized; there is no glare, and in warm weather the window may be kept open to permit free circulation of air. This plan is very much superior to shades or awnings.

Great strides have been made in the art of lighting during the past generation. From the gaslight we have progressed to the carbon-filament electric lamps, thence to the tungsten, then to the tungsten gas-filled "half-watt" lamp (one-half watt to one candle power), and finally to the fluorescent lamp. As each different type of lamp has been developed, the factors of the problem of illumination have changed.

Definition of a Foot-candle

Inasmuch as the standard for measurement of high illumination intensities is the "foot-candle," it may be well to define just what is meant by that term.

A candle or lamp gives off an innumerable number of rays of light in all directions. The measurement, however, must be of one ray, since only one can strike a definite point. A *candle power,* therefore, is the measure of the strength of a source to produce illumination in a given direction and is expressed in the power of the light of a standard candle in a horizontal direction, such candle being made according to certain standard specifications and burning under certain specified conditions. Since light is given off in all directions, the *mean spherical candle power* is the average of all candle powers in all directions. If this standard candle is placed in the exact center of a sphere, it will give off one candle power in all directions, and the theoretical average or mean spherical candle power would be one. Candle power, however, gives no indication of the quantity of light—it is a measurement of but one ray. If we wish to measure the quantity of light, we must use a unit which will express not one ray, but a quantity of rays covering a specified area. If a standard candle is placed at the exact center of a hollow sphere having a radius of one foot, and the interior painted black, to eliminate reflection, it will cast rays of light on the entire inner surface of the sphere. This surface area we know to be the square of the diameter multiplied by 3.1416, or 12.5664 square feet, and to measure the quantity of light, the *lumen* is used. This

term denotes the amount of light in a sphere of this size, thrown on *one square foot*, and since the light is thrown in all directions there would be 12.5664 lumens of light given off by one standard candle burning in the center of a sphere having a radius of one foot. Usually this is called 12.5, the last three decimal figures, 664, being disregarded, and if the *mean spherical candle power* is divided by 8 (with proper regard to the decimal point) we have the lumen rating. Therefore, if the mean spherical candle power in the above-mentioned example is 1, multiplying this by 12.57 we get 12.57 lumens, or dividing 1 by 8, we get 0.125, and by moving the decimal point two places to the right, we get 12.50. From the lumen we obtain the *foot-candle.* If a light measuring *one lumen* is so utilized that all of it is spread over an area of one square foot, that surface will be lighted to an average intensity of *one foot-candle.* This relation enables us to calculate readily the amount of light required for a given intensity covering a given area. When we know the number of square feet to be lighted, and the intensity desired, we need only multiply the area by the number of foot-candles to find the number of lumens required, and, when this is known, we can determine the number and kind of lamps to be used. Thus, if an area of 15 by 30 feet, or 450 square feet, is to be lighted to an average intensity of 10 foot-candles, 450 by 10, or 4,500 lumens, must be utilized. The utilization of light, however, is not the same as the quantity of light given off, as will be explained later.

Intensity of Light Required

As outlined in the opening paragraphs of this chapter, the ideal intensity of light, that is, the amount of light which the person of average vision can use in reading, over continuous periods of hours at a time, to be repeated day after day for years, without strain, has not been scientifically determined, nor does it appear likely that it will for many years to come, for the following reasons:

1. There are wide variations in human eyes, even among persons of the same age, this variation covering not only departures from the normal in vision but differences in sensitivity. It would be extremely difficult to determine the norm in this direction.

2. The power of vision does not remain stationary; as one develops from youth to maturity and thence to old age, more and

more light for clear vision seems to be required, but no definite law governing this has yet been found.

3. The average eye seems to be adaptable to very wide ranges of light intensity. It is possible to read in the light of 0.05 of a foot-candle and also in the shaded light of 2,000 foot-candles, the latter having 40,000 times the intensity of the former.

4. It is extremely difficult to measure accurately eyestrain or fatigue.

Because of these difficulties in the way of scientific determination of the problem, it has become customary for lighting experts, medical experts, oculists, and others, to set an arbitrary figure as to the intensity of light which is *best suited* for office work, and, as might be expected, these figures vary widely.

Nevertheless, it is possible, with the Luckiesh-Moss visibility meter, to compare one visual task with another, and to determine how much more light is required for the more difficult task.

Factors of Artificial Lighting

The first factor is expense. Artificial light costs money not only for current but for erection of plant and general upkeep. The expense, however, should be weighed against the results before one can tell whether or not it is too great. The result expected from the purchase of electric current is illumination, and this, to balance against the expense, must be at least sufficient in volume to enable the users of the illumination—the clerks—to perform their work efficiently. Therefore, if clerks can do more and better work with good light than with poor light, and that they can is perfectly obvious, it is evident that scrimping on the electric current, if considered a saving, is counterbalanced by the poor work.

Eyestrain is the next factor and is placed second instead of first because, in our opinion, and judging from experience, most cases of eyestrain are due either to unduly low intensities or to glare, due in turn to a badly designed lighting system. Whether eyestrain is ever caused by reflection of light from the paper, with very high intensities of artificial light, is a debatable question. As will be seen from Fig. 14, outdoor illumination in the shade usually ranges above 1,000 foot-candles. Many of us are certain that the ideal of comfort is to sit under the shade of a tree, reading a book on a summer day. How long we can read

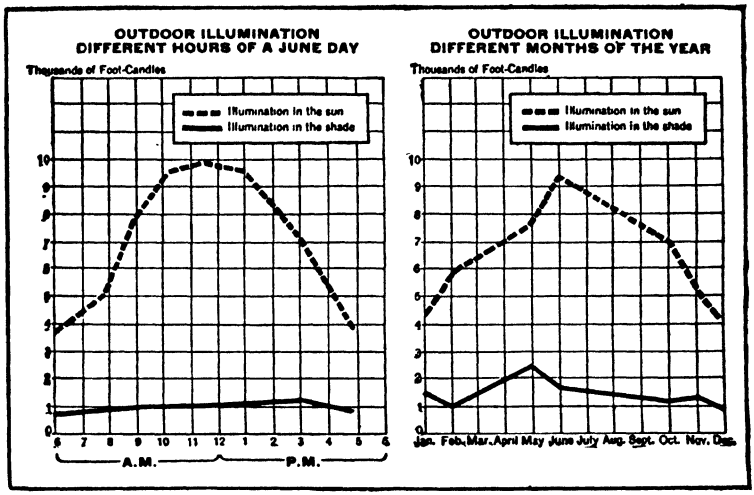


FIG. 14.—Charts showing daily and monthly variations in outdoor illumination.

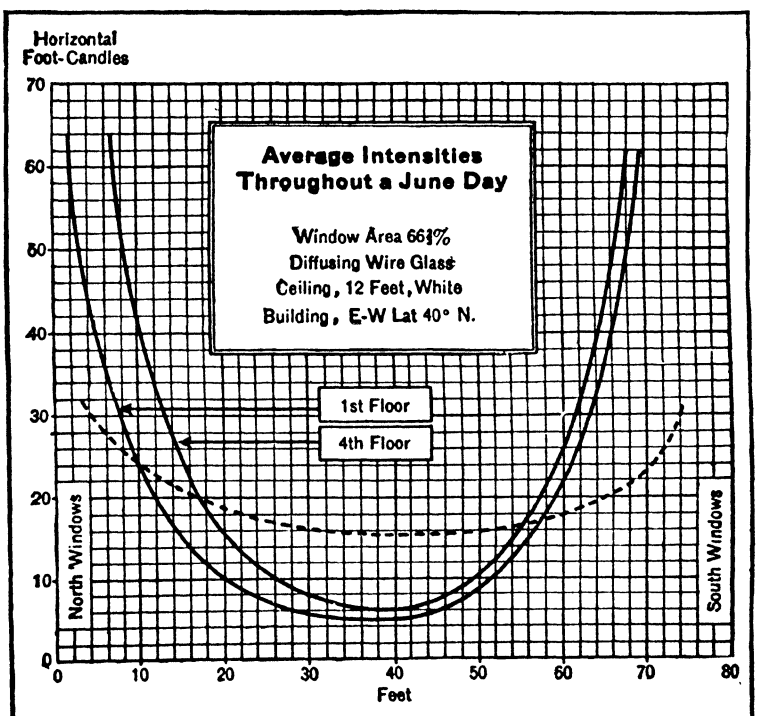


FIG. 15.—Variations in interior daylight illumination on first and fourth floors.

without strain under any conditions, and how long a clerk should be expected to read even under the best conditions of office lighting, and what intensity of light should be used to permit him to read for this length of time are questions which each individual, in the present state of our knowledge, must decide for himself, but it certainly seems reasonable to believe that an intensity of from 40 to 50 candles, which is the indoor daylight intensity shown in Fig. 15, represents an approximation to a sufficient amount of light.

The amount of heat generated and radiated by artificial light is the third factor and is an appreciable one where high intensities are used, as anyone may demonstrate who attempts to handle a nitrogen-filled lamp which has been burning for a few minutes. Fluorescent lighting, developed commercially only since 1938, makes possible much higher intensities than filament lamps and produces but one-fifth the heat for the same amount of light.

The fourth factor is the amount of wiring provided in the average building, which sets an absolute limit on the amount of light. In many of the office buildings erected over 25 years ago, it is not possible to get general illumination of a greater intensity than 5 foot-candles, and 10 foot-candles is the limit in most of them unless fluorescent lighting is used.

Considering all these factors, the practical ideal intensity should be set at 20 to 30 foot-candles and the basic minimum practice at 10 to 15 foot-candles.

Artificial light in the average office will usually be found to range between 3 and 5 foot-candles, not considering fluorescent lighting.

Causes and Effects of Glare

Glare may be defined as an intense light from any source, which, in the regular course of the work, strikes the eye at intervals. Its source may be a naked light, or it may come from a reflection on some bright metallic surface, or from a ray of sunlight reflected from a highly polished or glass desk top. At just what point of intensity the glare becomes annoying cannot be determined, because some eyes are far more sensitive than others. It may be accepted as a truism, however, that glaring light sources or reflections are never advantageous in office work and should be eliminated in all cases. The physiological condi-

tion induced by glare is that the pupil of the eye involuntarily contracts when a bright light strikes the retina, and expands when the light is reduced or removed. Glare, therefore, causes this contraction of the opening of the pupil while the light is striking it, and expansion as soon as the eye is turned away. A moving picture, greatly enlarged, of the pupil of the eye under these circumstances would show alternate contraction and expansion, a continually changing condition which is exceedingly fatiguing to the eye muscles. In addition to, and because of, this, the acuity of the vision is decreased.

Disadvantages of Drop and Desk Lights

An office with many drop lights was a common sight a few years ago, and there are still a considerable number of such offices in existence. These lights are unsightly, the cost of wiring is high, and there is heavy expense when the wiring is changed to suit changes made in the location of the desks. The change of location of drop lights for this purpose is sometimes not made, a temporary makeshift being used by shifting the perpendicular of the cord, which is usually done by tying it with string, to some solid object in the neighborhood, usually a steam pipe or other metallic projection. This practice is not only still more unsightly but is contrary to the wiring codes of most cities, as it contains elements of danger from fire.

Desk lights are open to the same objections, with the additional one that the fixtures are expensive. Besides, local lighting as given by desk lamps concentrates a high intensity on one small spot on the desk—often as high as 25 foot-candles—while the rest of the room may be lighted at an average of 3 or 4 foot-candles. This causes an excessive and most irritating glare and distinctly affects the acuity of the vision, for light in one small area, of a brilliancy much greater than the surrounding area, has the same general effect upon the eye as glare. This can be demonstrated by noting the effect when coming from a dark room to a brilliantly lighted one. A candle in an otherwise dark room will cause the sensation of glare.

Three General Systems of Lighting

There are three methods of office lighting in general use, each of which will be described in due order. In considering each of

these forms, it is well to remember that good, effective illumination is the prime objective, that neither the first cost nor the cost of current should be the deciding factor in choosing between them.

Direct Lighting.—Before the commercial development of fluorescent lighting, direct lighting with filament lamps was the cheapest in current consumption. A reflector placed over the lamp sent the light directly to the desk level, but resulted in glare and reflections and distributed the light unevenly. With fluorescent fixtures, direct lighting is now not only the cheapest form of lighting in current consumption, but also the most satisfactory from the standpoint of intensity of illumination. A 40-watt white fluorescent lamp has an output of 50 lumens per watt, compared with only 20 lumens per watt for an incandescent filament lamp in a 300-watt size or larger. Furthermore, as has been previously stated, the fluorescent lamps give off but one-fifth the amount of radiant heat for the same amount of light as the filament lamps.

Semi-indirect Lighting.—In semi-indirect illumination, a translucent dish, bowl, or reflector is placed under the lamp, projecting part of the light to the ceiling, from there to be deflected downward, but allowing part of the light to be diffused through the glass underneath. This form of lighting is intermediate between the direct system and that which will be described in the next paragraph. It is more expensive than the direct system in consumption of current. With an improper type of unit, where the light shining through the globe is too intense, glare is produced. But when a well-designed unit is selected and the installation is correctly planned, an even distribution of light results, with soft shadows. This system can be made very decorative—if that is considered a desirable object.

Totally Indirect Lighting.—In this system the unit consists of an opaque reflector below the filament lamp. This reflector projects *all* the light to the ceiling, which is so colored as to give the maximum of reflection. The result is an even diffusion of light and an entire absence of glare. If the installation is effectively arranged, with sufficient intensity, there is a very close approximation to well-diffused daylight.

Recommended Standards for Office Lighting

The General Electric Company recommends the following:[1]

[1] *Office Light Conditioning*, Nela Park, Cleveland, 1939, p. 10.

Foot-candles	Area	Foot-candles	Area
5	Corridors and stairways	20	Intermittent desk work
10	Reception room	30	Detailed desk work
10	Vaults	30	Bookkeeping and accounting
10	Conference rooms	30 to 50	Stenographic work
20	Mail sorting	30 to 50	Drafting
20	Filing and index references	30 to 100	Operating office machines

To indicate the steady increase in recommended levels for office lighting, the following table is of historical interest:

Date	Foot-candles	Date	Foot-candles
1909	2 to 4	1931	6 to 15
1913	3 to 6	1936	10 to 30
1916	4 to 8	1937	20 to 50
1926	8 to 16	1938	20 to 100

Maintenance of the Lighting System

Whatever lighting system is installed, it should not be forgotten that there are a number of factors of deterioration, and that therefore the efficiency of the system when installed should be sufficiently great to allow for this depreciation and still maintain adequate illumination.

First, there is the natural depreciation of the lamp. Lamp manufacturers rate their lamps at the average number of hours of light the lamp should give. This is 1,000 hours for gas-filled tungsten lamps and 2,000 hours for fluorescent lamps. When the lamp has depreciated to between 75 and 80 per cent of its initial rating, it should be discarded. In addition, dust collects on the outside of the lamp, and this also absorbs and reduces light. Another important point in renewing lamps is to make certain that the voltage of the lamps is equal to that of the current in use, for if the voltage of the circuit is higher than the rated voltage of the lamp, the life of the latter will be shortened. If it is lower than that indicated on the lamp in use, the latter will not emit the quantity of light it is rated for.

The reflecting equipment should be regularly washed and cleaned, otherwise dust will settle in the reflectors and cut down the efficiency of the light.

The surroundings will naturally, in the course of time, depreciate in their light-reflecting qualities. Dust, soot, smoke, and other deposits will in time cause such depreciation. Any porous paint, or surface covering such as calcimine or whitewash, is particularly susceptible in this respect. In industrial localities it is frequently necessary to paint ceilings every year and a half, and side walls every three years. In general it is cheaper to paint than to burn electrical energy or pay for depreciated eye efficiency in a decreased output.

The labor cost of cleaning lighting fixtures is so small that a regular cleaning program should be organized and fixtures cleaned at least once in three weeks. They can be wiped with a damp cloth and, every 12 weeks, should be washed. The main reason for the so frequently alleged failure of totally indirect lighting systems is to be found in this neglect, for in numerous instances lights of this character have been allowed to go uncleaned for 6 months or more. In one typical case, a preliminary measurement of the illumination was made, and afterward the reflectors were cleaned, new lamps of proper voltage substituted for the over-voltage lamps which were blackened from long use, and the ceiling was repainted. The subsequent test showed over 175 per cent increase of illumination.

Measurement of Light

The foot-candle meter is the simplest and least expensive instrument for measuring the intensity of light on the working plane. It has a stationary comparison or standard lamp and scale, the brightness of the lamp being regulated by a voltmeter and rheostat previously calibrated in a laboratory. When the lamp is held at the proper brightness, the spot on the scale that appears to fade out is receiving an equal amount of illumination from both the comparison lamp and the outside source of illumination, and that point is the value of the latter.

The Macbeth illuminometer is built on the same general plan. The illuminometer is read by focusing it on a test plate made of some white material, such as unglazed porcelain, which

has good light-diffusing properties, and which has also a previously known coefficient of light reflection. This plate becomes a secondary source of light. The values on the scale can be read directly when the instrument has been calibrated with the plate.

There are other meters on the market, but the two described illustrate the principles involved. They are valuable chiefly because they are portable, and they are accurate to within from 2 to 10 per cent.

Interior Decoration

While this subject is not exactly a part of the office equipment, it is nevertheless important from the standpoint of hygiene, eye comfort, and illumination.

Walls and ceilings are mostly painted, in some cases with a water paint (kalsomine) and in others with oil paint.

There are several factors here for consideration. In the first place, the walls should reflect, not absorb, the light, for generally speaking the color of a surface influences the amount of reflection of light. Dark-colored surfaces absorb, while light-colored ones reflect, the light, which indicates that if we desire to secure the greatest value of the artificial light, we should use a color for wall and ceiling surfaces which will reflect the greatest amount of light. But this is not entirely accurate, as will be pointed out later. It is a mistake, however, to consider walls and ceilings as the only reflecting surfaces. Unless specifically thrown in a certain direction, light rays, like sound rays, travel equally in all directions; therefore, all surfaces in a room either absorb or reflect the greater portion of the light they receive. In addition, it is well known that the intensity of light falling on any surface varies inversely as the square of the distance from the source. So, in a large room, where the walls are, say, 40 feet apart, they are of small effect as reflecting surfaces, when compared with the innumerable dark, absorbing surfaces of the floors, desks, machines, and persons in the room. The ceilings should be of the highest possible light-reflecting color, which is white. Ordinary white paint reflects perhaps between 75 and 78 per cent of the light thrown upon it. Magnesium carbonate has a reflecting factor of approximately 90 to 95 per cent, some tests showing it to be 98 per cent, the difference here being probably due to difference in the measuring methods.

The second factor is eye comfort. If the largest part of the light which is reflected into the eyes comes from surfaces with a low reflection factor, the presence of light surfaces on walls acts by contrast as a glaring source of light, and the comfort of the eye is materially affected.

For these reasons, we have consistently recommended white, cream, or ivory-tinted ceilings, with as high a reflecting factor as can possibly be secured, with an overhang of reasonable proportions varying according to the height of the room, and walls of a green or buff shade with a reflection factor of under 70 per cent, and preferably under 50 per cent.

The use of dark walnut or mahogany partitions in offices, where there is a row of private offices adjoining the main working room, is not to be recommended, as this furnishes another great light-absorbing surface. In many offices, partitions are painted in light colors; such partitions not only give a better reflecting surface but are also cheaper than the expensive veneered partitions.

Heat and Ventilation

Many experiments have determined with fair definiteness that the ideal office temperature is approximately 68°F. When the temperature either exceeds this point or falls below it, and remains so for some time, an uncomfortable feeling is distinctly experienced, and this lack of physical comfort inevitably means a lowering of the general output of work.

Offices which are on the street level are often uncomfortable on hot days, because of reflection of the heat from the street. Buildings also reflect heat, and it has been frequently observed on the upper floors that rooms on the side of a building adjacent to another are much warmer than those on the street side, a condition due to this reflection of heat.

Southern or eastern exposures which are subject to long hours of strong sunlight are often most uncomfortably hot. Glare and heat from the sun may be mitigated by the use of awnings and shades, but this practice cuts off light that is often greatly needed. In such case, the use of the venetian blinds previously described will as effectively distribute the heat rays as it does the light rays. The use of blue glass, or glass covered with a blue mixture, will also absorb the heat rays and render the room

much more comfortable, without cutting off too much of the light.

When the temperature drops below 60°F., office work is severely affected and the output decreases considerably. Drafts are not only uncomfortable but also dangerous to health, causing a chilling and consequent lowering of resistance to respiratory diseases.

A room in which the heat is automatically regulated by thermostatic control is much more comfortable than one which is alternately hot and cold. From the standpoint of health, there is danger when a room is overheated, and any temperature over 70°F. must be considered excessive.

Whenever radiators are placed elsewhere than below windows, it is not well to place a desk alongside them, as the excessive heat makes the location very uncomfortable. This condition may be mitigated somewhat by placing a screen in front of the radiator, which will have the effect of directing the heat upward.

The general conclusions of the New York State Committee on Ventilation in regard to the effect of various atmospheric conditions upon health and efficiency are that:

1. Even moderately high temperatures—between 24 and 30°C. (75 and 80°F.) are accompanied by demonstrably harmful results. With rising temperatures, the rectal temperature increased, the heart rate increased, and the Crampton index of vasotone decreased, while the rate of respiration was slightly increased.

2. Differences in comfort were slight between 68 and 75°F., but very marked when the temperature reached 86°F.

3. Somewhat exhaustive studies of the alleged influence of atmospheric humidity upon mental achievement yielded entirely negative results.

4. On the other hand, there was a very marked and significant influence of atmospheric temperature upon the performance of physical work —an increase of from 20°C. (68°F.) to 24°C. (75°F.) caused a decrease of 15 per cent in the physical work.

5. There was very definite evidence of the harmful influence of moderately high atmospheric temperature, particularly if followed by sudden exposures to low temperatures, in promoting susceptibility to bacterial infection. For these reasons the commission believes that the dangers of room overheating are far more serious in their effect upon human health and efficiency than has been generally realized, and that every effort should be made to keep the temperature of the schoolroom, and the living room at 20°C. (68°F.) or below.

Noise

That noise is a disturbing element is attested by the fact that practically every person when engaged in work that particularly requires mental concentration will, if possible, seek quiet and solitude. But these two conditions are impossible in business, as work of almost any kind is accompanied by more or less noise. Yet office work, being almost entirely mental, requires concentration, and the effort to concentrate amid noisy surroundings involves a strain that causes fatigue.

Many sources of noise exist within the office: conversation, the scraping of chairs on the floor, rattling of papers, the incessant pounding and clicking of typewriter keys, or other noise-making office machinery. The chief source of noise may, however, be outside the office.

Hard surfaces reflect sound and cause reverberations, while soft surfaces absorb sound waves. The requirements of modern building construction call for the use of hard building materials. In the typical modern office, the wall and ceiling surfaces are finished in hard gypsum plaster applied on concrete, hollow tile, or metal lath, and such rooms are very noisy. Every sound produced is noticeably intensified and permeates the entire room, on the same principle involved when a railroad train passes through a tunnel. No more noise is really produced than in the open, but the hard walls of the tunnel throw back the sounds, causing them to reverberate, and making the resulting noise much louder than that produced when running in the open air.

Rooms in residences are quieted by the introduction of soft, highly sound-absorptive furnishings such as hangings, upholstered furniture, carpets, and so forth, but such materials are not practical in the office.

The following table, which gives the coefficients of sound absorption of various materials used in building and furnishing, is of interest. An open window is used as the unit; one square foot of open window is considered as being 100 per cent absorptive, because all sound striking an open window passes out of the room.

The absorption of sound varies in accordance with its pitch, so the reader must bear in mind that the coefficients given are

for one pitch only—namely, one octave above middle C on the piano, which approximates the pitch of the voice.

COEFFICIENTS OF SOUND ABSORPTION OF VARIOUS BUILDING AND FINISHING MATERIALS

Materials	Coefficient
Open window	1.00
Cheese cloth	0.019
Plaster on tile	0.025
Brick set in Portland cement	0.025
Glass	0.027
Plaster on wire lath	0.033
Plaster on wood lath	0.034
Wood sheathing (hard pine)	0.061
House plants, per cubic meter	0.11
Linoleum, loose on floor	0.12
Cretonne cloth	0.15
Cork 2.5 centimeters thick, loose on floor	0.16
Cocoa matting	0.172
Carpet rugs	0.20
Acoustic plasters	0.20
Shelia curtains	0.23
Oriental rugs, extra heavy	0.29
Sound-absorbing tile	0.37
Hair felt, 1 inch in thickness	0.53
A person	4.70

A study of this list shows that the hard-surfaced materials reflect the sound waves, and soft or porous materials absorb them.

To neutralize the effect of the hard building materials, it is necessary to install over the entire ceiling surface of a room a material having a high coefficient of sound absorption. There are several companies which specialize in the application of such treatments and are uniformly successful in securing the desired results, and, in addition, the technique of application has been so developed, that a satisfactory appearance is produced.

FLOOR COVERING

The modern methods of constructing office buildings also bring in the problem of office floor covering. In some so-called loft buildings, no attention is paid to this important question and the concrete floor is left as originally laid. There is perhaps no more uncomfortable floor either to stand on or to rest the feet upon. It is cold, noisy, and generally unsatisfactory in other ways.

The factors of the office-floor-covering problem are as follows:

1. *General Comfort Underfoot.*—A floor covering should retain about the same temperature as the rest of the room; it should be resilient, should absorb shocks in walking, and should have an even surface.

2. *Sanitation;* that is, it should be made of a substance not too absorbent, which can be readily cleaned, and which will not provide a lurking place for either visible or microscopic dirt.

3. *Durability;* that is, it should strongly resist temperature and humidity changes, decay and disintegration; it should resist abrasion and wear uniformly.

4. *Sound Producing.*—The movement of chairs or human feet upon its surface should not produce a scraping sound.

5. *Sound Reflection.*—It should have sound-absorbing qualities.

6. *Ease of Repair.*—It should be repaired easily.

7. *Fire Resistant.*—It should resist fire to a reasonable extent.

8. *Maintenance.*—It should be easy to keep in condition.

9. *Good Appearance.*—It should have a good appearance.

10. *Reasonable Cost.*—The cost should not be excessive.

These 10 factors, it will be readily seen, are all of importance, but there is no known material that would rate 100 per cent on each of them. Some materials rate high on one factor and low on another. There is no doubt, for instance, about the durability of concrete and tile, but in most of the other factors these materials have many defects. Also, the only floor covering having high sound-absorbing qualities would be a rug or a carpet, but these are lacking in other important factors.

The American Hospital Association made a very extensive investigation of this subject the results of which were submitted to the annual conference of the association in September, 1922. The committee resorted to laboratory tests and examined, in all, 56 different types of floor covering and rated them on the 6 factors of abrasion, pressure, resistance to fire, absorbency of water, resistance to acid and alkali, and freedom from staining. As the subject of floor covering applies to office use, the committee's recommendations are: first choice, reinforced rubber; second, Battleship Linoleum; third, soft mastic.[1]

[1] Report of the Committee on Floors, *Publication* 47, American Hospital Association, Chicago.

Drinking Fountains

In the erection of the average office building, the question of the supply of drinking water is usually an afterthought. While it is true that most office buildings are supplied with a water system, the water is rarely cool, and it is difficult—in summertime especially—to induce clerks to drink it, the result being that companies do a thriving business selling bottled water and ice to cool it.

The best method for ensuring an adequate supply of drinking water is to furnish centrally cooled water, piped to the location and fed through fountains, but this can be installed economically only during the erection of the building and must therefore be designed in advance.

Whatever type of water supply is used, there should be a sufficiency of fountains. Good practice recommends one fountain to be placed in the center of each four bays, thus making the average distance for any clerk to travel for drinking water 20 feet. The usual practice is to provide fountains in hallways or out-of-the-way corners, so that not only do the clerks travel an unnecessarily long distance for water, but trips to these remote corners also provide excellent opportunities for office gossip and other unprofitable conversation.

The bubbler fountains are the most sanitary, though all makes are not so.

Where cups are used, paper ones should be provided, for, where individual glasses are given the clerks, the practice is likely to degenerate into that unsanitary abomination, the "community cup."

Toilet Facilities

The legal requirements on this question, in most states, prescribe a minimum of one toilet seat for every 20 persons, and separate toilets for each sex. Practically all offices comply with these requirements, although exceptions do exist. But these laws, though designed from the standpoint of minimum health necessity, do not prescribe that more than the minimum shall not be used.

From the added standpoint of efficiency, there should be one toilet seat for every 15 persons, and one washbowl for every 20,

with an abundance of mirrors—especially in the women's room. If these provisions are not made, clerks will spend an inordinate amount of time away from their tasks, and the cost of additional equipment will be paid for many times over in wasted time.

Cake soap is not to be recommended, for liquid or powdered soap, in suitable containers, is more sanitary.

Individual or "pull-clean" towels are desirable from the hygienic standpoint, but paper towels serve the purpose equally well.

Clocks

Every office should be supplied with clocks, properly regulated and keeping good time, in such a position that they may be seen from the desk of each clerk in the room. This will involve the expense of a number of clocks, but it is nevertheless real economy. "Clock watching" should be cultivated—not tabooed, as the copybook maxims imply. Of course, the real message behind the ban on clock watching is that a clerk should be sufficiently interested in his work, so that the passage of time is unnoticed. Experience has shown, however, that the clerks who use the clock as a pacemaker, or timemarker, accomplish much more than those who fail to mark the passage of time. In organizations where work is measured—as it should be—and time is recorded, the clock is a necessity.

Questions for Discussion

1. What is meant by "working conditions," and why is the subject important?
2. Comment on the general importance of lighting in offices.
3. How far does direct daylight penetrate a window?
4. How can the glare of direct sunlight shining on windows be prevented?
5. How may light be measured?
6. Define or explain "foot-candle," and "lumen," and state the use and significance of each.
7. Why has not the ideal intensity of light been scientifically determined? Or has it? What may be done about it?
8. Name four factors of artificial lighting and comment on each.

9. What are the causes and effects of glare?
10. Comment on drop lights and desk lights.
11. Name and describe three general systems of lighting, stating the advantages and disadvantages of each.
12. What standards of office lighting are recommended? Why?
13. What is involved in the maintenance of the lighting system?
14. Comment on the preferred colors of ceilings and walls for offices.
15. Comment on heat and ventilation in the office. What is the ideal temperature? Why?
16. Comment on noise and its importance, suggesting what may be done to minimize it.
17. What is the unit used to measure the absorption of noise?
18. What kinds of surfaces absorb sound?
19. What are factors of the office-floor-covering problem?
20. What is a good floor covering for office use? Why?
21. Comment on drinking fountains in offices.
22. Why are the legal requirements for toilet facilities not always satisfactory?
23. Comment on "clock watching."

Problem I

In the Iroquois Knitting Company's proposed office (mentioned in Chap. XIV) what should be done regarding lighting, daylight and artificial; heating; and ventilation? At present, the only lighting in the space is a direct unit with blue-shade reflector, suspended by cord from ceiling, and spaced irregularly to fit the workbenches and machines which were in place when the space was used as a factory. Heat is furnished by five 1½-inch pipes placed directly across the windows, about 3 feet from the ceiling. There is no ventilating system.

Problem II

In the proposed office space to be refitted for the Iroquois Knitting Company how would you handle the noise problem, floor covering, drinking fountains, telephone and electrical connections, toilet facilities, and the like?

What would you do about interior decoration?

XVI

OFFICE ARRANGEMENT

Scientific office arrangement is a particular field in which much remains to be done. Not too often are found offices the arrangement of which is in accordance with a well-defined, well-thought-out plan. It is by no means unusual to find departments divided between different floors, or to find crowded conditions in some places, while an excess of space exists in others. Nor is it at all unusual to find arrangements that violate almost every principle of scientific layout.

A particularly bad layout will frequently cost much more in wasted space and energy than would be required to entirely rearrange it, even if considerable expense were involved in the change. The waste entailed by a bad layout is a continuous daily expense which never ceases until eliminated by rearrangement.

It will be universally admitted that the general appearance of an office should be good, but usually this desirable quality is considered from one standpoint only—what will our visitors think about our office? The impression made upon visitors is of course important, but there are many other considerations.

In the first place, the arrangement should suggest to the casual observer that the office is efficient and businesslike. Second, the office must look neat and orderly and thoroughly up to date in every way. This does not necessarily imply new equipment; but equipment which is manifestly obsolete and behind the times, such as box files, letter presses, ancient bookcases, high-standing desks, and roll-top desks, should either be discarded or placed where it will attract as little attention as possible. All broken, badly scarred, and scratched equipment should be either discarded or renovated.

In addition to the general effect of disorder and carelessness, there is the constant danger of the loss or misplacement of important papers. Thousands of offices would save money, accelerate

work, and generally improve their clerical service by a drastic cleanup. Spasmodic cleanup periods have no permanent value.

Crowded conditions in an office not only mean physical interference with good work, but they also have a psychological effect; the annoyance caused by having to work in a crowded place, in itself is capable of reducing the output much more, and the morale of the establishment is injured just to the extent that this annoyance is acute.

Straight-line Flow of Work

One of the most important principles of modern industrial practice, which applies equally to the office and factory, is what is known as the "straight-line flow of work." The phrase is not to be interpreted literally—the lines need not necessarily be mathematically straight, nor the work perfectly fluid. The broad general meaning of the term, as used by the industrial engineer, is that the work, in the progress from one operation to another, should follow a course approximating, as nearly as may be possible, a straight line; that it should move ever forward from the beginning to the end of each subassembly, at least, and all travel backward or departure to either side of the course should, wherever possible, be eliminated, the theory being that all such reversals or departures from the shortest possible distance of travel tend to slow up the progress of the work, to interfere with its continuity and, besides, cause additional labor and loss of time by traveling in a circuitous path. That this theory is correct is manifested in a thousand ways in modern production, and it needs no argument for support, being completely obvious. But its application to office arrangement is more modern and is as yet not generally recognized. It is easy to understand that all travel through space, whether the conveyance of a casting weighing hundreds of pounds or a piece of paper weighing less than half an ounce, consumes both energy and time—mostly time—and, in the conduct of office work, time is a most important element.

The straight-line flow in office work increases the speed with which the work passes from one clerk to another through a specified routine. When combined with the unit plan of flow

where the work passes in specified units of 1, 5, 10, 20, or other such unit, the speed factor is greatly accentuated.

Another important result of this practice is that it greatly reduces messenger work, for it is apparent that when work flows in straight lines, the distances between the various operations will necessarily be short, the ideal condition being the arrangement of the desks so that work may be passed from one to the other, without the clerk's having to rise from his seat.

A result of even more importance is that the straight-line flow largely obviates the necessity of high-priced clerks and even executives acting as their own messengers, for where the work does not flow in this manner there is a constant tendency for clerks to do their own messenger work. To what extent this tendency becomes practice may be determined by an observational test, taken at frequent intervals, of the number of clerks standing on their feet or walking around the office. To make this test, enumerate all persons standing in the room at any time, excluding from the count file clerks, messengers, and other persons whose work requires them to stand. Make these observations at intervals of an hour each day, and record the results for a week, in order to get a reliable figure, and calculate the percentage of those standing, to the total number of clerks whose work requires them to be seated. If the percentage runs above 10 it is an indication of defective flow of work, and further observation will confirm the fact that those so found are mostly engaged in doing messenger work, a low-priced service, instead of the clerical work for which they are engaged. This condition, be it remembered, is in no sense the fault of the clerks, but at the same time it should not be overlooked that while a clerk is not at his desk he may be working, but he is not doing clerical work effectively.

Again, the straighter the line of flow, the less danger there is of losing or mislaying important papers, for it is mainly because of being handled in an irregular manner that papers become lost or mislaid.

In some offices, important routines, such as that of orders, are so planned that a conveyer belt or a similar transportation device carries the work from operation to operation, one at a time, as each piece is finished, as far as the portion of work done upon it by any one operator is concerned.

Analyzing the Flow of Work

Most office managers will agree readily enough with the principle of straight-line flow of work but find themselves at a loss as to how to rearrange the office so as to get this much desired effect. The most cursory observation will show that there are many countercurrents of work, and, if one were to attempt to chart the actual existing flow of *all* work on a floor plan of the office, he would inevitably produce a maze—a confused network of lines running in various directions, which no ingenuity could disentangle.

It must at once be admitted that it is practically impossible to arrange an office so that *all* work will flow in straight lines ever forward, never reversing itself or crossing its own path, the reason being that in very few offices is the work so simple that it can be all comprised in a few routines. In almost every office there are many routines, some large and consisting of many steps and a large number of details, others involving but a small amount of work and few steps.

Therefore, in analyzing the flow of work, the first step, obviously, is to determine which is the dominant routine, by which is meant the routine around which the work of the office as a whole revolves. In most offices where orders are handled the order routine will be the dominant one, many steps being usually involved and the volume of work great. In other offices a different routine may be dominant, such, for example, as a policy in an insurance office. When the routine, whatever it may be, has been selected, the next procedure is to count the number of persons in the entire office who work directly and exclusively on this routine; next a count of the persons who work part of their time upon it, figuring the percentage of such time, and from this, the total number of hours devoted to one specific routine may be obtained. Proceed thus with several of the routines that are obviously the most important, and the one to which the greatest amount of time is devoted may be considered the dominant routine. From each of these principal routines a number of smaller and dependent ones will be found to proceed, consisting of perhaps three or four operations only. These should be carefully studied to determine whether or not they actually belong to the dominant routine, and if it is found that they do,

the time required for them should be added to the figure already secured.

When the statistics of the problem have been gathered, the relative number of clerical hours required for each routine should be recorded and studied, and it is practically certain that it will be found that the amount of time required to perform the whole work of the routine will appear excessive when compared with the time required for each actual operation. Such a result is by no means surprising and is easily explained; it is the time lost through lack of direct flow, and this time—or most of it—can be saved through the establishment of the straight-line principle.

Departments with Many Lines of Flow

In any analysis of this kind, certain departments with many lines of flow will be found, such, for example, as the mailing and mail-opening departments. For the sake of economy these two operations are often combined—the clerks working in the morning at opening mail, and in the afternoon at enclosing, sealing, and stamping. Such a department is a service section and is not subject to the same flow as, let us say, the order section. The proper location for a combined service of this kind is a position from which it can most readily serve all other sections. It would not need lighting of the same intensity as is necessary for other kinds of clerical work, but it should be in a location where no unusual amount of walking would be needed to reach it.

A stenographic section is a similar example of combined service, but the conditions would be somewhat different, as will be explained later.

Central files also serve many departments.

In the establishment of such departments the dominant considerations should be (1) whether or not the location selected is the best for the purpose of the work; (2) whether the location is sufficiently convenient for all the departments to be served from it, and (3) whether it is satisfactory from the point of view of other departments—a noise-producing department should not be located adjacent to workers who require quiet, or, if so, it should be enclosed.

Locating the Departments within an Office

One of the most important features in office arrangement is the necessity for contact between one department and another,

or between one person and another. The ideal arrangement of departments is, of course, one which most closely conforms to the principles previously described, but as the departments of a business are usually interdependent, and, as they have more or less relation with one another, it is not entirely possible to carry out these principles rigorously, and some compromise will invariably be found necessary.

The first consideration in working out this question should be given to those departments which have the greatest amount of contact with each other, and such departments should always be placed together.

The credit department, in most companies, has frequent, almost constant, occasion to consult the ledgers in the bookkeeping department, and these two, then, should be contiguous. The collection department will need to consult not only the ledgers but the invoice files also. On the other hand, one or both of these departments, as well as the cashier, will have considerable contact with the general public; this fact must also be considered in determining their location. It would be unwise to locate such departments so that the public would be compelled to pass through the general office to reach them.

Certain other departments should be contiguous to the factory, if there is one, or to the salesroom, or stockroom, or shipping department.

Again, one department may have a great deal of business with another in the office, and these departments should naturally be adjacent.

Work which travels from one department to another in a routine requires that departments be so arranged that it may travel in straight or continuously forward lines, instead of crossing back and forth.

Departments in which there are a large number of noise-making machines, or where there is much telephoning or loud conversation or many visitors, should, if at all possible, be segregated from the rest of the departments. Noise is a most disturbing element in clerical work, and everything possible should be done to avoid or minimize it.

Central service departments will naturally have relations with most of the other departments, but it will be impossible to locate them contiguous to all such departments; and here again, compromise is to some extent unavoidable.

The stenographic department—also a central service—is a noisy one, and the combined sounds of a large number of machines in operation will disturb the workers in adjacent departments, so, if possible, this section should be located in a space that can be enclosed and thus shut off most of the noise. A point that should not be forgotten in this connection is that a stenographic department requires good lighting arrangements, and the enclosure of the space should not interfere with this need. If the sound-deadening treatment previously mentioned is used and the stenographers centralized, it will be unnecessary to place them in a separate enclosed room.

The filing can be done in the open office, and the files should be so located as to be most convenient to those who have the greatest occasion to use them.

Where there are departments which, through the nature of the work performed in them, generally present a somewhat untidy appearance, they should naturally be kept as far from the public view as possible, in order that visitors will not receive an unfavorable impression and judge the whole office by that one department. Such departments as circularizing, stockrooms, shipping rooms, and so forth, come under this general category.

The requirements of executives as to location are various. Certain of them will need much communication with certain others, and some will need almost continuous contact with the departments under their control; in the latter case it would be a mistake to locate such executives at a distance from their clerks. Other executives again, such as the purchasing agent, and the employment or personnel man, must be located where they can be readily reached by visitors, and without disturbance to the rest of the office. Still others must be placed near either the factory or the salesroom, if there are such in the same building. All these requirements should be carefully studied in advance, before making the new arrangement.

Relation of Workers with Each Other

The question of the relation of clerks within the department to each other, next comes up for consideration. Here the straight-line-flow principle should as far as possible be put into operation, and it is much simpler to do this within a department than to carry it out throughout the organization.

The requirement of each clerk as to light is a matter that requires careful attention. Of course, good light should be provided for all clerks wherever possible, but frequently there is considerable choice of location in regard to light. All clerical work, however, does not require the same amount of light. A bookkeeper or stenographer, as a rule, requires more light than does a mail-opening or stock clerk.

Certain clerks will need to be located near the files or other equipment they most frequently use, to avoid much travel back and forth. Clerks who use some particular machine part of their time should also be located near it. Machinery operated by electricity should be set up near to the floor or baseboard outlets, so that the placing of conduits over the top of the floor, for some one to trip over, may be avoided. It is not good practice to suspend cords from ceiling outlets, and in some localities the practice is forbidden.

A few clerks may be employed on work which requires them frequently to transact business with outside visitors, and they should be so located as to reduce unnecessary travel on their part.

There are also certain clerks who have frequent working contact with some particular individual. A stenographer, for example, may be called many times daily to take dictation from a certain person.

It frequently happens that two clerks are placed at desks facing each other, because they have much work to do in common. Investigation will show whether this is the best way to do such work; usually it is not.

Desirability of Uniformity

The general appearance of an office is always improved by uniformity of arrangement, but this does not mean that all desks and other equipment should be identical, nor would this be advisable. Used correctly and sensibly, uniformity means that there should be a general similarity so that the appearance is harmonious. It is obvious, of course, that all clerks performing one kind of work should have the same kind of desk, for if there is a miscellaneous assortment of desks of all sizes, types, and colors, a good-appearing arrangement will be difficult, if not impossible, to make.

Uniformity, in this sense, has also a considerable bearing upon the economical use of space.

Another desirable characteristic of uniformity of equipment in arrangement is that it makes for economy in replacements. If the desks used throughout the office are of a similar size and style, it will often be possible to take one from a place where it is temporarily out of use, and put it where it can be fully used. But if the desk is larger or smaller or of a different finish from the others, this constitutes an objection to the practice.

Planning the Arrangement

When a change in the office arrangement is decided upon, the first and most important procedure is to place the job in the hands of some competent person who will be able to devote all his time to the task, from its start to its completion. This person should have a complete and comprehensive knowledge of the needs of the organization, before he starts work, and should begin by making all the studies outlined here. The larger the office, the more important is it that this study should be made by an expert, or at least guided by one. But whether or not the work is done by an expert, the person doing it should, for the time being, have no other duties. It is easy enough to call in a draftsman from the engineering department, or from the outside, give him a few instructions, and order him to go ahead and make a new arrangement, but the result will not be satisfactory in any respect. It will be still less satisfactory if the job is assigned to some clerk, though it is a common practice to attempt rearrangement in this manner. Drafting is the least important part of the whole job, and, when all the studies have been completed, it may be assigned to any clerk or outside draftsman. Another popular plan is to appoint some subexecutive or senior clerk to take charge of the details, and then send him around to the various departments to inquire what is wanted. Since he has no authority, and everyone in the organization knows that his knowledge of the subject is negligible, he makes little progress in welding the organization together and producing a workable plan. In such case, the department chief who has the greatest "pull," or demands the most, gets what he wants in the way of comfort, good light, and ventilation for himself, regardless of how it may affect others, and the more modest executive who is usually an easy-going fellow,

and rather backward in making demands, has to take what is left. In the office of one large organization, the matter of new arrangement was handled in this manner, and as one result, there was a grand scramble for choice spots in the new building, and much ill feeling was developed. Executives with small departments, fighting for prestige, secured good locations and proceeded to fence them off, spending thousands of dollars for needless, space-wasting partitions, so that the location would be worthless for anyone else, while large departments like the bookkeeping section, and other large groups of clerical workers, were crowded into congested spaces, with poor light and ventilation, merely because the head of the bookkeeping department was not as influential or as aggressive as the others.

The person chosen for the work of planning the arrangement should be one who has all the needed authority, who is capable of winning cooperation, who has no other duties for the time being to distract his attention, and who can and will give the question the necessary and adequate study. Such an individual will work to produce a condition which will best serve each department, executive, and clerk, and the result will be a scientific arrangement.

Making a Plan of Present Arrangement

When the work of rearrangement has been placed in the hands of a competent person as above described, the next step is to make a drawing to scale of the existing arrangement. At first sight this may appear to be useless work, but as will appear later it is a most important step, even though the existing arrangement is not to be preserved. The best scale for this purpose is one-quarter inch to the foot; the use of a smaller scale makes accuracy difficult, besides being difficult to read and to judge distances, while a larger scale is unnecessary. If the floor is so large that the drawing becomes unwieldy and difficult to work with, the latter can be made in sections. In any case it is impossible to take in with the eye the drawing of the entire floor, when it runs beyond 25 inches in length (100 feet), so that there is no advantage in having it all in one sheet.

Each desk and piece of equipment should be drawn accurately to scale, showing the exact present location.

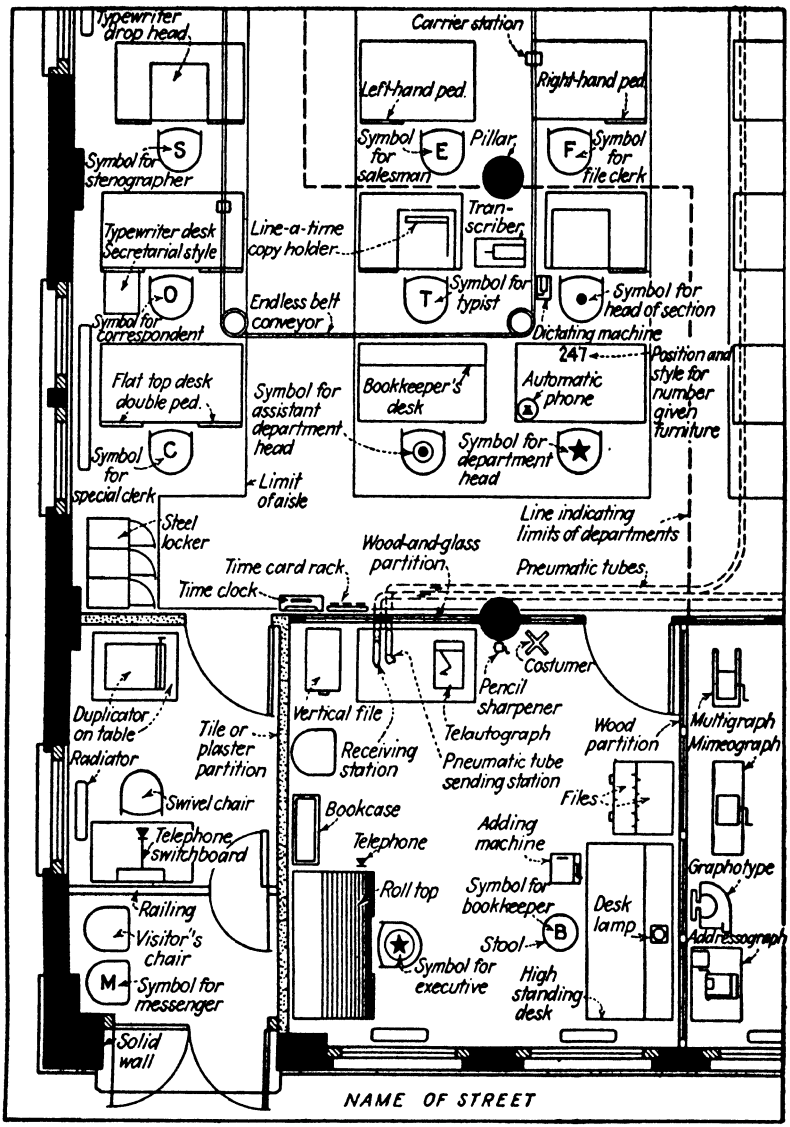


FIG. 16.—Standard symbols are used to indicate each piece of equipment on the floor plan; otherwise the result would be a mass of rectangles meaning little. With symbols like those shown above, it is unnecessary to name the pieces. It is done in this section of a large office layout simply for the purpose of identifying the symbols. It will help to number each piece, as shown in Fig. 17. These numbers will appear on the typewritten list and will be helpful in planning the rearrangement, as well as in directing the moving.

When this drawing is finished, it should be traced in ink on a tracing cloth. If the floor is to be rearranged in the same location, it would be well first to make a tracing of the floor without the desks and have lithoprints made of this on tracing cloth, with one extra on white drawing paper. This will save retracing it for the new arrangement. The existing layout can then be put in.

When this drawing is complete, have five lithoprints made on rather heavy paper, or colored cardboard, one green, one yellow, and three white. The use of lithoprints instead of blue prints is recommended because the former do not shrink, while the latter do. Blue prints will often shrink a half an inch to the yard, which will make the drawing wrong by two feet or thereabout.

The lithoprints are used as follows: One of the white prints is used as a guide, one to mark flow lines upon, and the third, as well as the green and yellow prints, will be used for templets.

Mapping the Flow of Work

Take the white lithoprint and mark thereon the exact course followed by the work on the dominant routine, from desk to desk. Then follow with "flow lines" of the next two most important

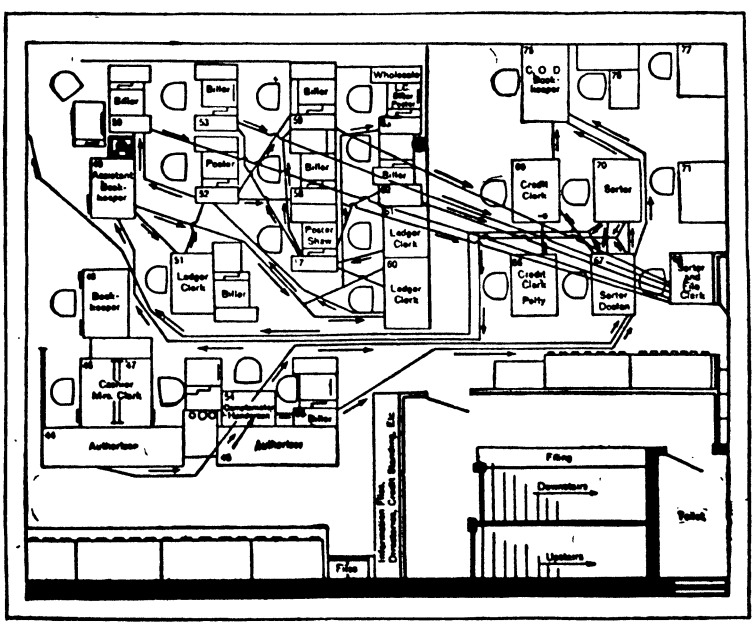


Fig. 17.—Mapping the flow of work.

routines. As a rule, this will be sufficient; if other routines should be shown, additional prints should be used, as it is confusing to have more than three routines shown on one sheet. Different colored pencils should be used for drawing the flow lines, so they may be readily distinguished. This work will require some time, but the result will well repay the time expended. It is not at all unusual to find conditions similar to those illustrated in Fig. 17, which is only part of one large office. Executives who study a flow map of this kind will begin to understand why so many clerks are necessary to do the work in the present manner, and they are likely to develop a wholesome respect for the work thereafter.

Cutting Templets

The three lithoprints reserved for templets will then be cut up, the white first, the other colors later on. It will be found best to cut them so that the desk and its accompanying chair will be on the same templet—a method which saves much rehandling. The templets for each department should be kept together in envelopes, and before cutting up, two complete lists of all equipment in a department, one on cards and one on a typewritten list on a sheet, should be made for future guidance. The cutting should be close to the line, though the actual line should be left on the templet. All templets should be carefully preserved in envelopes, as it is a very easy matter to lose a desk or filing cabinet templet, a loss which will cause much extra work when the shortage finally is discovered.

The green templets denote that the desks and other equipment shown in that color are expansion equipment, while the yellow templets represent new equipment which is to be purchased.

Figuring Expansion

As outlined in a previous chapter, expansion should be figured and allowed for in the new arrangement. The study for this should be made before the new layout is planned, and by the use of templets, due space is allowed in the new plan. The expansion will be figured in percentage of growth, which must be translated into actual number of new clerks required, and shown by allowing space with the green templets. The plan to be followed should be to provide this expansion in the new layout, so that at a future

time, when the new clerks are employed, space will have already been allotted.

Making the New Templet Layout

In planning the new layout, the best way is to take a lithoprint of the new floor, bare of desks, and place it on top of a piece of cork carpet cemented to a piece of three-ply veneer. It can be pinned in place with thumb tacks and the whole arrangement handled in much the same way as a drawing board, if the edges are square to each other, and can also be carried about readily from one place to another. On this the templets are pinned, with glass-headed pins like those used for maps.

But before pinning the templets on the plan, it is necessary to get a general idea of the allotment of space for each department, and the studies previously made will aid in this. Every department will then be represented by simple rectangles, and this allotment of space should then be discussed with the chief of each department and his approval secured as to the general location. This discussion will require some time and will probably cause some argument. The person in charge of planning the new arrangement will learn much of human nature in these discussions, but, as this knowledge will be valuable to him, he should not feel unduly discouraged or consider it a waste of time. Unless a department head is satisfied with the general location allotted him, he certainly will not agree with the final plan, but there should be a good, logical reason for the location of each department, and this reason should be fully and patiently explained.

The general allotment of space having been approved, it then becomes necessary to decide upon main and cross aisles. The former should be preferably 4 to 6 feet wide, with an absolute minimum of 3 feet, and the latter should be 3 feet wide and not more than 20 feet apart. These aisles should be lightly sketched upon the plan with pencil.

Not more than two desks should be placed side by side, and if possible each desk should be next to an aisle, so that the occupant of the desk can rise and pass down the aisle without disturbing any other worker.

There should be, from the front of one desk to the back of another, a minimum distance of 30 inches, which allows ample

seating space for the ordinary chair. Executives, or persons using a tilting back chair, should be allowed a minimum of 3 feet between desks.

The templets should be then placed, but not pinned, on the board, tentatively, until it is certain that the desired arrangement is possible, and they should then be pinned in place.

After the templets representing the existing equipment of a department have been arranged, the green templets representing space allowed for expansion should then be put in place. If there are any pieces of equipment which are to be abandoned, a yellow templet of the desired size (to scale) of the new equipment to be purchased should be pinned in its proper location.

When the layout is thus completed the flow lines of the three main routines may be indicated with colored strings wound around the pins holding the templets. This new layout can then be compared with the flow lines in the old plan of arrangement, and the improvement will be instantly and graphically displayed.

The new arrangement thus depicted should then be "sold" to each department head. When approval is secured, the person approving should sign his name to the templet plan. This precaution makes it more difficult for him to change his mind and thereby cause extra work, because most people feel bound to stand by their signature when once it is given.

After all the signatures have been obtained from the heads of the various departments, the signed plan should be taken to the senior management, explained, and duly approved by signature in the same manner.

It is now ready for the draftsman to make the final tracing on tracing cloth.

From this tracing an adequate number of blue prints for telephone men, electricians, movers, and others can be made.

Questions for Discussion

1. What is the importance of the appearance of an office?
2. What is the effect of crowded conditions in an office?
3. Explain fully "straight-line flow."
4. What results may reasonably be expected from "straight-line flow" in office work?
5. Is it possible to arrange an office so that all work will flow in straight lines? Explain.

6. How would you proceed to analyze the flow of work? In the course of your analysis, what would you discover about the routines in the office?

7. What is a "dominant routine"?

8. Why should some departments have more lines of flow than others? Illustrate your answer.

9. List the special considerations affecting the location of different departments and comment on each.

10. Where should executives be located?

11. What factors affect the location of certain clerks?

12. Comment on the meaning, desirability, and importance of uniformity of arrangement.

13. What is the first and most important step to take before planning the office arrangement? Why?

14. Why is it wise to make a scale drawing of the existing arrangement?

15. What is the best scale to use? Why?

16. Why are symbols used to indicate each piece of equipment?

17. How would you map the flow of work?

18. What is a templet, and how is it made and used?

19. When should one calculate and allow for expansion?

20. How would you make the new layout?

21. Why should the approval of each department head be secured as to the location and arrangement of his department?

22. How should desks be arranged in an office? Why?

23. How much space would you allow for aisles? and between desks?

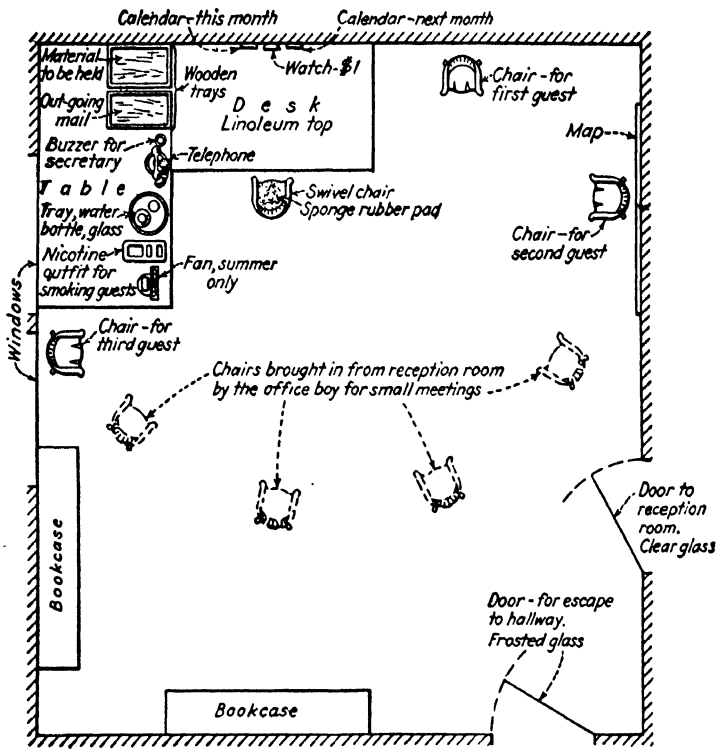
24. How would you indicate the flow lines of the main routines on the new layout? What is the advantage of doing this?

25. What are the three final steps, after final approval by all department heads?

Problem I

Draw up a list of symbols representing the different pieces of office equipment, using the illustration in the text as a guide. It may be an aid if these are arranged alphabetically.

Problem II



Criticise this arrangement from the standpoint of the work of an executive. State whether it would be satisfactory for a routine worker, and give reasons.

Problem III

In planning the proposed office of the Iroquois Knitting Company (mentioned in problem for Chap. XIV) make a tentative arrangement, with the following facts to guide you:

There are 27 inside telephones in use. The electrically operated machines number 17, including Hollerith machines in the statistical department. There are about 40 typewriting machines in use in all departments combined.

There are approximately 200 office workers, divided in this manner:

Purchasing department	6
Credit department	9
Order department	26
Correspondence department	14
Statistical department	22
Accounting department	14
Planning department	23
Pay-roll department	12
Timekeepers department	20
Shipping department	12
Stenographers, typists, and private secretaries	32
File clerks	10
	200

XVII

THE OFFICE WORKER AND HIS JOB

Most reasonable people will agree to the standardization of equipment, materials, methods, and working conditions. But some will hesitate at the mention of standardization of personnel, in the mistaken belief that scientific management aims to cast all people in one and the same mold. When the term "standardization of personnel" is used, it does not mean that one type of person is to be selected for all types of work, nor that all work is to be made to fit a standard type of person. It does not mean that human beings are to be reduced to automatons or deprived of initiative by making labor a joyless drudgery. Quite the contrary.

Scientific management recognizes that human beings are highly diversified in both physical and mental capacities, and that these basic traits are fixed and unalterable. Nevertheless, every person is entitled to serve industry in the capacity for which he is best fitted, and scientific management endeavors to find a place for each where he can do the work for which he is naturally best fitted and most capable. Therefore, the phrase "standardization of personnel" clearly signifies the application of the scientific method of standardization to the problem of handling the personnel of an organization; or in other words, standardization of the method of solving the problem of selecting, employing, training, and managing that personnel.

What Standardization of Personnel Involves

1. Standardization of personnel involves a constant effort on the part of those undertaking the work, to learn how to differentiate between persons; how to recognize the essential characteristics that distinguish them, and to ascertain in what respects these characteristics differ.

2. It involves the ability to determine the characteristics required for a specific position. Until we have learned to

differentiate these characteristics, we cannot determine accurately, but, in so far as we have determined them, we should be able to recognize the particular characteristics required for any particular job.

3. It also involves the ability to select the person best fitted for the work—that is, the person possessing in the highest degree and number the various capacities required to perform it.

4. Finally, it involves the training of the people thus scientifically selected, so that they may perform the work according to the standard method established.

Personnel an Important Management Function

Of all the functions of management, the personnel function is one of the most vital and at the same time probably the most difficult to execute. It is a field which for the last decade has been the subject of more legislation and discussion than almost any other. In most organizations the personnel function is a specialized field, often in charge of a special staff man reporting directly to the president of the company. The director of personnel, as he is often called, is not only responsible for employment and training, but he also participates generally and specifically in all activities that will tend to keep employees satisfied, cooperative, and productive.

It is obvious that since the office manager is inseparably interested in bringing about the attainment of those objectives with respect to the office employees, he should be thoroughly familiar with principles and techniques for doing so. In those offices where the office manager is also primarily responsible for the personnel function, the importance of the subject is paramount.

How Men Differ

A famous scientist once summed up his study of mankind in the statement that man is what he was born, plus his environment and experience. Men differ both physically and mentally, but it is certain that their mental differences are greater and more striking than their physical differences. In the mental history of every man there are probably countless currents extending back through his myriad ancestors, which manifest themselves in many curious ways, and exist alongside the

characteristics he has acquired through environment and experience.

The subject logically divides into two parts: (1) the native traits or characteristics with which the person was born and (2) traits and habits acquired through experience and environment during his lifetime.

The native traits are fairly well fixed, inasmuch as most of them have been emphasized and nurtured during childhood through contact with the parents from whom they were inherited, and these remain and influence the conduct of the individual all through his life history.

Acquired characteristics, those derived from environment and experience, exert a very powerful influence on the life of the individual, but these are fluid rather than fixed and are constantly changing as their sources change. The environment acts upon the individual, who in turn, to some extent, reacts upon the environment. Experience changes individuals but is itself to a great extent volitional, and within certain limits the individual chooses his experience. The worker, for example, is affected by his work, his job, to the extent that he possesses the capacity for adapting himself to its conditions, and on the other hand the job is affected by the worker to the extent that he possesses initiative and the desire to change.

Physical Capacities

The primary physical capacity is undoubtedly health, for with it other capacities may to some extent be acquired, but without it all others are affected.

Bodily strength is a capacity of varying importance, probably of less importance now than formerly.

Eyesight, which, aside from general health, is the most valuable capacity, is perhaps the most neglected.

In some occupations, hearing is a most important capacity, but in office work slight defects in hearing are negligible as a handicap.

Dexterity is of considerable value in some office occupations, but in others it is not especially required.

A most valuable capacity in all office operations is coordination, including work of hand and brain.

Appearance is a capacity much in demand in some positions, and desirable in all.

Manner is a capacity of great value in all occupations where there is contact with other workers.

Mental Capacities

Most physical capacities are capable of measurement, and there is little disagreement as to their evaluation, though their relative importance on some kinds of work is not so well recognized as it should be. Mental capacities, however, are not so easily recognizable, or so capable of precise definition. Nevertheless, the problem they present must be approached in a scientific manner, and there is little doubt but that in the course of time it will be possible to detect the most important mental qualities and make approximately correct measurement of the varying degrees they exhibit.

Judgment is an invaluable capacity in all office work, as it is, to a greater or lesser degree, required on every operation, but at the same time it is perhaps the most difficult to define correctly. It may be described as the decision between two or more facts of greater or less similarity, the comparison of one or more facts with a standard, or the decision to take one course of action in preference to another. When differences are wide, there is little need of judgment—considered as a deliberate mental operation—but when there is but a narrow margin of difference, judgment in this sense is necessary. Ordinarily we do not judge matters and things that can be measured, but instead let the measurement decide the judgment. Where a person takes one course of action in preference to another, his judgment is good or bad according to whether the results of the act are successful or otherwise.

Initiative is the capacity possessed by some persons which causes them to change the established order of things in greater or less degree, to take on work without instructions, or to assume the leadership in new ideas. In some occupations this capacity is the highest value, but it may often prove dangerous. It is satisfactory so long as the leadership is exercised in the proper direction and results in good for the organization, but it often follows devious and uncertain paths, getting into sidetracks at times and occasionally reversing the direction. Unless controlled by judgment it is likely to invite disaster. The value of initiative has been greatly exaggerated, when applied to all persons in an organization. As often defined, an organization is a

collection of persons working together for a common end, and if this is to be accomplished, initiative must be placed under strict control, as its chief value is found in the leaders.

Aggressiveness is a latent capacity in most people, but in some it is highly developed. A certain amount of it is necessary in an organization, but, like initiative, it should be under strict control. Otherwise it is not a social asset.

Thoroughness is an exceedingly valuable capacity in office work, since most office operations are of a character where attention to details is vitally important.

Disposition is assumed to be the general conduct of a person in his relations with others. In executive positions a good disposition is invaluable, and in all occupations it is desirable.

Tact and diplomacy are closely allied capacities, which in some office positions are extremely important and in others practically negative—except as they touch upon relations with fellow workers.

Organizing ability is a very rare capacity, and when discovered in an organization it usually marks the possessor for promotion to an executive position. It is evidenced in the manner in which its possessor carries on work, even though he works by himself.

Supervising ability is equally rare. It is the capacity to oversee the work of others, detecting wherein it may be wrong, keeping it up to standard and carrying it along smoothly and without rupture, disturbance, or disagreeable episodes.

Culture and knowledge are purely acquired capacities of different value and varying importance in office occupations.

Skill in specific lines is a necessary capacity in all office occupations, and especially so where scientific management exists.

The foregoing constitute the mental capacities which are to be mostly considered in office work, though the list is by no means exhausted.

The Interest of the Workers

The things an employee is interested in represent his volitional life and are of the very greatest importance to the management. What the worker wills to do is of far greater moment to him than the work he does for a salary, and if these interests are antagonistic to his work, he will never do the best work of which he is capable. A high-class executive once related a story of a worker

who had both longings and capacities for handicraft work, and who would have made an excellent carpenter, but who nevertheless, for social reasons, desired to work in an office. His work there was decidedly ineffective and the salary he earned was considerably less than he could have earned as a carpenter—the work he liked to do—but he felt it a social degradation to put on overalls and doff his white collar. If, on the other hand, a worker is interested in his job and is ambitious to perfect himself in its performance, he will do so because in this case his interests and his work harmonize.

Opportunities

Another potent factor is to be found in the opportunities the position offers to the worker. His capacities may be large and his interests harmonious, but, if the opportunities of the position are not such as to enable him to use his capacities to their fullest extent, the net result will be correspondingly lowered. If such a condition is only temporary it may have no serious effect, but if long continued it will gradually atrophy the capacities and dull the ambitions of the worker.

In using the term opportunities, much more is involved than conditions for advancement or promotion. The opportunity to use the capacities we possess is of greater import than the question of emolument, though the latter is undoubtedly not a small matter. Opportunity heightens interest and increases capacity, and all three act and react upon each other to a very large extent.

Scientific management, therefore, seeks to solve the personnel problem by finding (1) the person with just the right capacities—not an excess of them, not more than can be used on the job; (2) the person whose interests harmonize with the work; and (3) to provide this person with a job which affords him opportunity to develop his capacities to the fullest extent.

The Types of Office Workers

In every position we shall find that there are factors involved which make for either effective or ineffective work. The problem is not one of merely finding the person who can do the work and who will stay on the job, yet this is exactly the way most companies have apparently been attempting to handle the situation.

In considering the various types of office workers it must be

kept in mind that we are considering dominant traits only. Each person has, in a more or less developed degree, many capacities, and in like manner each position requires a certain amount of many capacities, if it is to be properly filled.

The Executive

This type of worker must be the possessor, in a high degree, of many capacities. Organizing ability stands high on this list, for the executive who is not an organizer will not be effective even though his other capacities be highly developed. His judgment should be of a highly discriminative character, for upon it much depends. If in addition he possesses initiative and aggressiveness he will be successful. Tact and diplomacy, though desirable, are not essential, while supervising ability is of great importance. Culture and knowledge are placed last on the list, because, while desirable, great and notable business successes have been achieved without them. The executive of the highest type will have all these capacities well developed, but such a man is rarely found.

The Executive Assistant

For this position the same characteristics are required as for the executive, though not to such a degree of development. Thoroughness, however, must be present. If the person is an understudy for the executive, he should possess these capacities in a much higher degree than if he were merely an assistant looking for no higher position.

Staff Investigator

This position, which is also that of an assistant to the chief executive, denotes a person having charge of some particular staff function. It requires, first of all, knowledge and skill in the specific line covered by the work, a discriminating judgment, and considerable initiative. Thoroughness is a requisite for this position also. If the staff investigator possesses any of the other capacities of an executive, they can also be utilized in the position.

Department or Section Head

The subexecutive requires, in a lesser degree, practically the same capacities as the chief executive, and as a rule the holders of these positions have the opportunity of becoming chief execu-

tive, if they have these capacities highly developed and occasion arises. Department heads, therefore, should be selected with this end in view. In this position, supervising ability is of more importance than in that of the chief executive, and skill in specific lines is valuable.

Expert Clerks

Such workers as expert clerks, bookkeepers, and stenographers first of all require skill in their specific lines, with thoroughness as an extremely important quality. To a limited degree, initiative is of value, but the development of this capacity should be strictly controlled. A knowledge of the work in general also tends to improve results and enlarge opportunities.

Detail Clerks

Clerks whose work is of a detail nature, not requiring expert knowledge, must possess first of all the capacity of adaptability in a high degree; second, skill in specific lines; and third, knowledge sufficient for the work. Needless to say, thoroughness is also required.

Junior Clerk and Apprentice

These positions require similar capacities to the last two mentioned categories, though to a lesser degree.

Analyzing the Job

In dealing with the subject of the analysis of the job, it should be borne in mind that there is a necessary distinction between the occupation and the job. The former may be considered as comprising the latter. For example, the term stenographer denotes an occupation, but this occupation is composed of several specific jobs, such as taking dictation, typing letters from dictation, and so on. While it is necessary to determine the qualities required for any occupation, this can be accomplished only by taking the sum total of the capacities required on each job of which the occupation is composed. Hence, with this object in view the analysis of the job is the starting place.

The best method developed up to the present for this purpose is to appoint specially trained interviewers to do the work if the office is a large one; if small, it can be done by the personnel

manager, or by the office manager himself. The interviewer must be able to separate essentials from nonessentials, and to discriminate closely as to the degree of each major capacity required. The work calls for a high degree of general intelligence, the ability to analyze, and a well-developed faculty of judgment on the part of the interviewer.

At the beginning of this investigation, a rough classification of the various occupations in the office will aid the subsequent work, though after the investigation is finished it will be generally found that the classification is not in agreement with the facts discovered. Nevertheless, it will serve as a guide to the investigators, in the character of a useful hypothesis.

Before the investigators begin work on the analyses, they should, if there are several to be made, hold a series of conferences in which the work they are to do is discussed, carefully explained, and thoroughly understood by all who are to take part in the investigation.

Getting the Facts

The interviewers then proceed to secure the facts required as to the essential capacities for each occupation, through the medium of personal interviews with the workers in that occupation, information which they will supplement with their own observation. The essential information required is as follows:

1. The name of the occupation, with any alternative names by which it may be known, and a statement of the various places where it is performed.

2. A statement of the duties of that occupation, giving the functions performed and the responsibilities.

3. The conditions of the work should be described as relating to the following:

a. Location.

b. Time—whether permanent or temporary work, hours of labor, and so forth.

c. Whether the work is performed standing or sitting, or walking, or in other position.

d. Whether or not speed is a requisite.

e. The amount of accuracy required.

f. Degree of automaticity—that is, whether it is varied or monotonous.

g. Disagreeable features, if any, should be noted and described.

h. The method of pay, the rate, and whether or not there are bonuses and premiums attached, or penalties of any kind.

i. The relation of this occupation to others.

In this connection, all occupations which naturally lead to this one and higher positions, utilizing the experience in the lower occupation, should be mentioned.

4. The worker should be fully described as to age, sex, race, and nationality, together with the mental and physical capacities required.

Occupational Description

From the information thus obtained, an occupational description for the use of the employment interviewer might read as follows:

Name of Occupation.—Clerk in mail-opening division.

Age.—17 to 20.

Sex.—Female.

Statement of Duties.—This worker must sort letters by departments, operate a Lightning mail-opening machine, and open and sort letters properly. Other work will include making out statement of cash received for the cashier, which statement must balance with the cash received; after the mail is opened and delivered, she will be expected to address envelopes by hand, and to perform minor clerical tasks as called upon.

Statement of Responsibilities.—The worker is expected to get the mail opened and distributed as early as possible, in order that other clerks may work upon it. She will handle a considerable amount of currency and checks, and should therefore be honest and trustworthy.

Conditions of the Work.—It is done in the mail-opening department. It is necessary for this clerk to report for duty one half-hour before the office opens, in order to get an early start. She will be relieved one half-hour before the office closes. The work is permanent.

Posture.—Most of the work is done in a sitting posture, but there is also a considerable amount of walking about.

Speed.—This is required.

Accuracy is very important.

Automaticity.—The work is varied in its general character, but when skill is developed, the various methods should be performed with automaticity, but never to the extent that inaccuracies creep in.

Disagreeable Features.—With the exception of the early start, there are none.

Method of Pay.—The weekly wage offered for starting is $..... Possible limit of salary in this position is $..... In addition to the salary there is a bonus for quantity of work performed at the standard rate.

Penalties for Errors.—None is prescribed.

Relation of this Occupation to Others.—Junior clerks with the required capacities may be promoted to this position. Occupants of the positions may be promoted to the cashier's section, or to other clerical operations, such as card entry clerks, file clerks, and so forth.

Nationality.—American.

Physical Qualities.—Healthy; average strength; normal eyesight.

Education.—Grammar-school graduate or better.

Experience.—None necessary.

Skill.—Can be developed.

Language Ability.—None.

Personal Qualities.—Good appearance; cooperative ability to work with others; adaptability, speed, accuracy, with ordinary judgment.

Analyzing the Nonroutine Job

It is possible to standardize the work of any clerk, whether that work is of a routine character or not. There are many tasks performed by nonroutine workers which are similar in nature to some of the routine jobs, and, if the one best method has been determined for doing the latter, it is equally applicable and should be used by all, even the nonroutine clerks. The secretary, for example, will be called upon to do many operations which may be standardized elsewhere in the office, and—provided the amount of training necessary is not too great—she should be taught to perform them in the standardized way.

In some nonroutine jobs, it is very difficult to list, offhand, all the duties that are to be performed. The best way to prepare the material for such a list is to have the worker keep for several days, or a week if necessary, an analysis-of-work sheet, which is merely a record of each duty as it is performed—the time taken and the number of pieces done—if the work is measurable. From a careful study of these records the office manager will be able not only to prepare a list of duties but also to make many improvements in the manner of performing them. It may perhaps be observed, from a study of these sheets, that the clerk is not doing the work in the best order, that there are too many changes of work, many unnecessary interruptions, or other impediments to the progress of the work, and such knowledge will be of great value and assistance in standardizing. When the list is as complete as the investigator can make it, it should then be submitted, for consideration, to executives and department heads who have contact with this worker, for they can often suggest additions to the list, or possibly detect things that should not be

done by the particular clerk or kind of clerk whose work is being studied.

Analysis of the principal duties should be made. Some of these can perhaps be determined without extended study, while others will be of sufficient importance or volume to justify the most careful and scientific study, which should be done in the manner described elsewhere.

The writing of standard practice on the portions of the work studied will naturally form part of the work of the original investigator. Current-practice instructions should be written out much in the same manner as outlined below.

Training should, as a matter of course, immediately follow the established practice.

When the nonroutine jobs are thus standardized, it will be seen that a distinct improvement in the control of the office manager follows, even though in some special instance it may not be possible to develop methods of wage payment which will act as an incentive to a high output. However, this is frequently possible.

How to Proceed

The standardization of the work of a nonroutine office worker should be conducted as follows:

1. A list of the principal duties should be made. This is sometimes called an assignment record, because it shows the duties assigned to the worker. These duties should be divided as follows:

a. The Daily Duties.—These are the standardized duties which the clerk is supposed to perform each day. As their number will not be great, they can usually be typed on a card which can be kept in the desk or other convenient place.

b. Calendar of Duties.—This may be either a special calendar made up monthly, or a yearbook such as may be procured from any stationery store. In it, the standard duties to be performed, whether weekly, monthly, or on any particular day of the month or year, can be entered in advance; if necessary they can be entered for the whole year. Space should be left on the page for each day, so that in this space the clerk can enter such additional memorandums as may be required afterward. As each duty is performed, it is checked off on the calendar; should it happen that

any are left undone at the end of the day, they may be transferred to the next convenient day.

c. Duties for specific days, to be brought up by tickler and transferred to *b.* This should be a special folder, in which the clerk can place special instructions for work which is to be performed at some future date. If there are any papers to accompany the memorandum, they can also be put in the folder, the object of which is to enable the clerk to locate at once all matters of this kind. If there are a great number of such papers, a special file should be provided. At the same time that the memorandums or papers are placed in the folder, a special tickler note should be made out and placed in the tickler to come up at a date several days in advance of the date in question. When the tickler note comes up, a memorandum of this duty should be transferred to its proper day in calendar *b.* The reason for bringing it up several days in advance is to provide against the contingency of assigning more jobs for that particular day than can be done in a day.

d. Duties to be Done as Soon as Possible.—There will always be assignments that need not be done on any particular day, but which should be done at the most convenient time. These are the types of tasks which, in the ordinary office, are usually neglected from day to day, until finally it is useless or too late to do them. No task whatever should be assigned for completion at an indefinite time. When the assignment for a task of this kind is made, a final date should be set for its completion in such terms as "any time before . . . ," and for this purpose the clerk should have an assignment book in which these assignments can be entered in chronological order, that is, as they are received. The record should contain a brief statement of the thing to be done, and if necessary, a reference to more complete instructions filed elsewhere. Whenever the assignments in calendar *b* are noticed to be few and light, the clerk should be instructed to look over this assignment book, to discover if it is possible to start on one of these jobs. At the time of making the entry in the book it may be possible to estimate the number of hours required to do the job, and if this estimate is entered along with the record, it will be of considerable assistance in planning the day's work. When the assignment is actually begun, a record of the date of starting is entered; when the work is completed, the date of com-

pletion should also be entered and the assignment crossed off the book with a blue pencil or other form of marking which will stand out prominently.

2. These duties should be carefully studied, and the method of performing them standardized.

3. Complete standard-practice instructions should be formulated for the performance of all standardized work of this character, and current standard-practice instructions for whatever portion of it remains unstandardized.

The specific instructions for each job should be a matter of gradual preparation, and this should be a major assignment for the incumbent of the position; each sheet of instructions, as it is prepared, should be approved by the executive to whom the clerk reports. As a rule it is difficult to get a clerk to prepare these instructions, for at first he cannot do it and learn the duties of the position at the same time; later, when he has learned the duties, he cannot see the necessity of writing instructions for himself. It should, however, be explained to him that these instructions are for an emergency, and in such event may prove invaluable. If the clerk, for any reason, should be absent, the work must go on just the same; unless the substitute has instructions already prepared, there will be many small details overlooked, and it may be that some important matters will be neglected.

The sheets of instructions, as they are prepared, should be bound in a binder, which, when not in use, should be kept in a specified place in the clerk's desk.

In the initial preparations for such a set of instructions, time should not be expended in making minute and elaborate classifications. These should be written down when their need is suggested by some actual occurrence.

When the most important matters have been worked out in writing, they should be properly classified for easy reference and written up in final form. Loose leaves with blank space at the end of each classification will facilitate changes and make much copying unnecessary.

4. Training should be given for all nonroutine tasks in the same manner as for thoroughly standardized work.

The following examples of nonroutine workers are used for illustration purposes only and by no means exhaust the list.

What is given here is mainly for the purpose of illustrating the manner in which the work lends itself to standardization.

The Telephone Operator

Courtesy over the telephone is a subject that needs to be carefully studied and taught. For some reason, not altogether clear perhaps, most people do not talk over the telephone in the natural manner in which they would converse with a person in their presence.

Next to courtesy in importance, is tact. Without this, important inquiries may be entirely lost to the company, and customers unnecessarily annoyed. Though it is a natural characteristic of some people, who have it much more strongly developed than others, it can still be inculcated until it becomes an acquired characteristic; many naturally tactless persons have developed this trait considerably through experience.

There should be standard methods for calling and answering. Each company decides for itself the standard response to be made to the telephone ring; the telephone operator should then be taught that response as standard. The announcement of the name of the company may be sufficient to indicate to the person calling that he has the right number; in all cases, care must be used in pronouncing the name clearly.

In like manner, the method of getting the name and business of the person telephoning should be standardized and carefully taught to all who have occasion to answer the telephone. "May I tell him who is calling?" will be more likely to get a response than "Who's calling?"

Trained substitutes should be provided to replace the operator during the lunch hour and at other times when she may have occasion to leave the switchboard temporarily.

A competent and well-trained telephone operator will also be able to help standardize the use of the telephone throughout the organization and control its undesirable use. Telephone communications with customers and others should be standardized as to methods of conversation, even to the extent of using certain standard phrases, to fit common occasions which are many times repeated in telephoning.

The operator can help control the use of the telephone for personal calls by clerks, which is discouraged in most companies,

as it may monopolize the lines when customers desire to call the company. To avoid impairing office morale by absolute denial of this privilege, some companies, while not allowing clerks to use the telephone for personal calls or the reception of messages, permit the operator to receive and deliver messages for clerks. This she can usually do with little loss of time or danger of delaying customers, thereby eliminating all the needless telephone conversations so prevalent among young people.

Other companies require all personal telephone calls by employees to be made and received from certain telephones or from a telephone booth. The telephone operator can thus keep track of those who are abusing the privilege.

The control of toll and long-distance calls is a difficult problem that faces many office managers. Certain members of the organization would much rather telephone than write, even when time is not an important factor. Some concerns have their telephone operator make a record of each long-distance call showing the type of service used, the date, the person placing the call, the person and company called, the time of day, whether or not the call was completed on the first attempt, the number of minutes talked, and the cost of the call. This record is sent to the person making the call, for his signature, then to the department head for approval, and finally to the accounting department for distribution after checking and paying the telephone company's bill. If there is any question about the call having been unnecessary, or on company business, this record will provide a basis for control.

The Reception Clerk

All visitors get their first impression of a company at the reception desk. In some cases the reception clerk is also the telephone operator; but if there is too much of either kind of work, one or the other will suffer neglect.

For exactly the same reason as the telephone operator, the reception clerk must possess the habit or trait of courtesy to a high degree; it may be considered a prime requisite in this position also. The development of good will frequently begins at the entrance to the office—the reception room—and the person assigned to receive visitors should be selected with that fact vividly in mind. Some offices install as reception clerks cour-

teous, elderly gentlemen who perhaps have passed their period of usefulness as clerks, but who never forget that they are gentlemen. There should be a standardized manner for handling each type of visitor, and this method should be uniformly courteous.

Janitorial Work

In the average office the work of cleaning is perhaps the most unsatisfactorily performed job. If the office is one of many that are located in a large building, the cleaning is generally provided by the management of the building. When the office is sufficiently large to employ its own janitor crew, the work is usually more efficiently executed, but as a rule there are large opportunities for improvement in the methods of performing it.

In such an office, the first step in standardizing this work is to determine what should be done; in such an investigation many things will undoubtedly be discovered which should be done, but which the janitor has overlooked. Every task connected with this work should be listed and a study made of the time required to do each item in a workmanlike manner. Any portions of the work that require special treatment should be investigated and done in the best way possible; the process should then be standardized.

The next step is the scheduling of the work. Some parts of it are not necessarily daily tasks, but a definite time should be set for their performance. Some offices have a special janitor's program worked out, much on the plan described earlier in this chapter.

When the work has been completely standardized and scheduled, periodical inspection should be arranged. All cleaning tasks which should be performed daily should be subjected to a daily inspection by some person delegated for that purpose, and the results of his inspection reported to the proper person.

Office-appliance Repairing

Where a large number of office appliances are used, it is decidedly economical to employ a regular mechanic whose duty it is to keep all such appliances in repair.

As a rule, the service stations of the companies manufacturing the appliances will be glad to give the necessary training on the

machines at their repair rooms, provided, of course, that the company employing the repair man will pay his salary while he is learning. An investigation probably will show also that for certain appliances, it would be wise to keep on hand certain repair parts which need frequent renewal.

As a rule, machine operators are not mechanics in any sense of the word; not only are they unable to understand the reason for a breakdown, but often they cannot detect something wrong that will inevitably lead to a breakdown. Certain types of machines will require frequent, and other types, only occasional, inspection. The time of inspection should not be left to the mechanic; it should be selected for him instead, and he should be required to report to some responsible person when an inspection has been completed.

Questions for Discussion

1. What does the phrase, "standardization of personnel," involve?
2. How does scientific management seek to solve the personnel problem?
3. Why should the office manager be familiar with personnel principles and techniques?
4. What are the two main points to be considered in studying the human element?
5. List eight physical capacities of the worker and comment briefly on each. Which of these physical capacities do you consider are the most desirable for office personnel? Why?
6. List ten mental capacities of the worker and comment briefly on each. Which of these mental capacities do you consider are the most desirable for office workers? Why?
7. Why is it important for a worker's outside interests to harmonize with his work?
8. What effect have the opportunities of his position on the worker?
9. List seven types of office workers and indicate the dominant traits each should possess.
10. What is the distinction between the "occupation" and the "job"?
11. What factors must be considered in analyzing the job?

12. How may the qualities required for any occupation be determined?

13. What essential information is required in making a job analysis? Do you think any of these are unimportant? If so, why?

14. How would you proceed to standardize the work of a nonroutine office worker?

15. What is an assignment record, and why is it so termed?

16. Do you believe there are benefits to be realized from standardizing the work of a nonroutine clerk? Explain.

17. Why should complete standard-practice instructions be prepared for a nonroutine position?

18. Name four nonroutine workers and describe or explain the duties of each.

Problem I

Mr. Williams, an old and valued employee of the Proctor Pencil Company, has a wide list of duties. He checks all invoices for unit price and accuracy; he has charge of all export shipments; he keeps certain personal records for the president; and he makes for the controller a daily and weekly report of all sales. When orders are coming in heavily, he neglects the export shipments and, vice versa, orders are held up for export shipments. His reports are always late. A study of the actual quantity of work performed, however, shows that he is only doing about half a day's work. His excuse is that his work is constantly interrupted.

How would you proceed to reorganize Mr. Williams' work?

Problem II

Carl Bailey, the controller of a paper mill, won his position because of the excellent work he did for the proprietor. He came from a humble family and began his work as a ledger clerk. When he was finally promoted to the position of general bookkeeper, he attracted the attention of the owner, who permitted him to handle, out of hours, his personal books. Bailey made the best of his opportunity and, before many years had passed, he was made controller of the whole company. Soon, however, it developed that he was overworked, as he insisted on doing all the work himself. He was querulous and had few friends in the organization. Employees feared him for he was constantly

ferreting out some "miscreant" and firing him. He had a peculiarly irritating habit of pointing out faults of workers publicly. He was a wizard at figures and could detect almost instantly any discrepancy in a financial report.

What do you think caused this sort of development? Do you think this man is in the right place? How would you use him? What are his weak points, and how would you strengthen them?

XVIII

EMPLOYEE TESTING

A trade or occupational test is one designed to determine in a short period of time whether or not a person possesses the specific capacities, ability, and skill used to a large extent in any particular trade or occupation and, if so, to what extent he possesses them.

Although tests have been used for this purpose for many years, and rapid progress has been made, many offices still cling to the old wasteful method of employing clerks on the basis of "trial and error."

The Trial-and-error Method

This consists of employing persons who can pass the initial observational examination satisfactorily, for a trial period, and if they pass this successfully they are placed on the permanent staff. The entire method is so loose and uncertain in its application that placing persons on the permanent staff who are far from thoroughly satisfactory is not entirely unknown.

Such a result is by no means unexpected, for as a matter of fact the method is defective in every respect. First, the salary paid to the unsuccessful clerk who has been "tried" and found lacking is largely wasted, for, as a rule, the company gets little work in return for it; second, the time of the company is wasted, and this may be and often is a loss of far greater magnitude than the salary paid, for work of vital and pressing importance is frequently delayed because clerks are not trained to handle it effectively. Third, there is the cost of the training, for, as a rule, while the companies using the trial-and-error method of employment do not have extensive or even definite training systems, the clerk is left to pick up the work as rapidly as he can—that is, he is permitted to train himself, though the process is not recognized by that name. Nevertheless, there is a training cost attached, for the beginner makes many mistakes in his efforts at

self-training, and these are sometimes expensive in their after effects. The trial-and-error method in this sense involves a sort of training, though an utterly unsystematic and futile one.

It is the most costly employment method in existence, and it almost invariably means poor placements. If good results are obtained, even in one individual case, it is an accident, due in no sense to this method. Turnover is increased far beyond the point of necessary changes, and in such offices it rarely falls below 25 per cent and often rises above 50 per cent.

How Special Abilities Can Be Tested

Yet if the various capacities needed for any particular occupation are analyzed, it will be readily perceived that most of them can be determined by relatively simple tests. Let us take, for example, a typist. The capacities she could possess are listed below:

1. *General Intelligence.*—This should at least be sufficient to prevent the worker from making the most obvious blunders. It is often assumed that a typist needs little general intelligence if she is to be used for straight copy work. While it is hardly to be expected, perhaps, that a beginning typist will have the same degree of understanding as that required of an experienced private secretary, she should have a reasonable amount of intelligence if she is to avoid the simplest errors. A typist with the mind of a ten-year-old child is—outside of the simple mechanical work she has learned—but little more valuable for office work than a child of ten years.

2. *Spelling.*—Some proficiency in this art is certainly required. Some persons apparently can never learn to spell, and it has been cynically observed that they invariably gravitate to typing. Nothing is so irritating to an executive or so damaging to the reputation of a company as letters with a number of misspelled words.

3. *Grammar.*—A typist may not be able to speak correctly, but she should at least be able to detect common grammatical errors in writing.

4. *Punctuation.*—At least the periods, commas, and semicolons should be correct.

5. *Accuracy.*—A typist who spends most of her time erasing will not possess much net speed.

6. *Touch System.*—This is so unquestionably better than any other that no typist should be employed that does not use it.

7. *Speed.*—To be able to earn even a small salary, a typist must have the habit of speed.

These seven simple requisites of a typist are easily perceived by every employer, and each one can be determined by a short test, in a manner sufficiently conclusive to reduce the failures by 75 per cent. As a matter of fact, several of them can be determined by a combined test not requiring over 30 minutes to give, and it could be given to several typists at the same time if necessary.

Now it is apparent that if a test can be devised that will determine the above seven qualities in 30 minutes' time, the use of such a test would be immeasurably superior to conducting employment on the trial-period basis. The fact is that such tests have been devised and are being successfully used in many organizations.

Importance of Having Standard Tests

There is a rough-and-ready method of testing clerks, which to a certain extent is employed by many companies. It consists of giving them a piece of work to do, observing them during the course of its performance and examining the finished piece. The selection in such cases is a matter of individual judgment and not of scientific measurement. In this offhand method, sufficient thought is rarely given to the matter of selecting work that is fairly representative of that which will be done on the job; as a rule, no record of the time expended is taken, and seldom does the employer know how the work compares with that of other clerks. In short, this method of testing cannot be considered as scientific, though it is doubtless better than the trial-and-error method, in that it possibly gives some information beforehand.

Essential Considerations on Trade Tests

These should be so constructed that they require but little time to give and to mark, and if it is possible to give the test to a number of persons at the same time, so much the better.

They should also be devised so that they can be marked and rated without laborious study. The technique in this matter has been so highly developed with the experience of the past

few years, that not more than one or two minutes are required to correct, mark, and rate any trade-test paper.

These expeditious conditions were obtained in the army tests, by (1) avoiding wherever possible the necessity of composition on the part of the person taking the test, and reducing the amount of writing to a minimum, and (2) by making up the test so that it could be scored with a specially prepared stencil.

For example, the test on common sense contained three questions similar to the following:

Why ought every man to be educated? Because:
- ☐ Wilson was a teacher.
- ☒ It makes him more useful.
- ☐ It is expensive.

A cross indicates the correct answer; no writing is necessary. Placing a transparent scale, bearing the correct answers, over the examination paper shows whether the testee's answer is correct. A modern method of quick scoring is to provide the testee with a special graphite pencil for marking his answers. Placing his question sheet on an electrically operated scoring machine will instantly show the score on all the questions on the sheet. These machines are used to score some of the National Clerical Ability Tests, described later.

Tests should be so graded from the simple to the complex that the least-intelligent applicants can answer some of the questions in the beginning; the questions henceforth should grow increasingly difficult until only the very highest intelligence can make a perfect score. Such a score, if made, should be an indication that the person making it had developed in a high degree the capacity which it was designed to show.

Primary Test for All Office Work

As all office work is accomplished with the aid of the eyes, it follows that eyesight is the primary and the most fundamental physical quality required and should therefore be definitely tested first. If defects in vision are found, it should be made a condition of employment that they must be corrected if possible. There is no reason, of course, why this expense should not be borne by the employee, but some companies arrange that proper glasses can be fitted for their employees at low cost, many oculists being willing to make special terms for this purpose.

Test for Spelling

With those who have had long and frequent practice, spelling is a subconscious process. A typist does not spell with the eye so much as with the fingers, though she of course must possess the ability to recognize a word correctly written and detect an incorrectly written one.

In selecting the words for a spelling test, it is most important to choose those which will ordinarily be used in the work to be done. In a business office these will usually be words that most frequently occur in the ordinary business correspondence. In other establishments, such for instance as an engineer's or lawyer's office, there will, in addition, be a large number of technical words.

When the list is compiled it will be necessary to examine it for words which are most usually misspelled, and a list of these should be prepared in gradation from the simplest to the most difficult. A spelling test can be given in several ways, the oral method being to repeat each word, allowing time for the person being tested to write it, but this method usually requires too much time. Another method is to write the words incorrectly in a list, intermixing them with words correctly spelled, and then require the underscoring of the misspelled words, leaving a space where they can be correctly written. Still another way is to give several spellings of each word, and require that the correctly spelled word shall be underscored.

Grammar Tests

This is a subject on which most people have forgotten the rules learned in their school days, if sufficient time has elapsed since they made a study of them, so in giving such tests it is inadvisable to ask for rules. If, however, a person can recognize the correct form of expression from a choice of several, it is sufficient for business purposes. A test for grammar, therefore, should include a number of sentences such as the following with the correct and incorrect wording given, the right expression being sometimes placed first and sometimes second:

I have (went—gone) to town.
He (done—did) the job yesterday.
I (have seen—saw) him before I saw you.

Such a list should contain from 30 to 50 sentences, graded progressively in difficulty.

PUNCTUATION

The tests for this should include capitalization as well as the ordinary punctuation marks. The following ingenious test is taken from Cody's *Commercial Tests and How to Use Them.*

Elementary test—10 *minutes.*

1. Draw a short line under each letter that should be a capital, marking directly on this sheet:

john askam, esq., was awarded the degree of ll. d. at the last commencement of dartmouth college. He is a professional bacteriologist in the service of the state of massachusetts, i. e., he is employed by the state board of health. in his appointments president wilson favored the east rather than the west. he wrote for the national educator.

2. Insert commas where needed.

In the course of time when you have grown older and wiser you will find men and women who will appreciate your hard work you will get your reward and the satisfaction of having done your best will be a compensation in itself.

In the first place if I know anything about John Higgins it is morally certain that he was not the thief. However I should not advise you to do it for I fully believe you will lose money if you do.

Will you kindly let us know by return mail just when you expect to ship our order No. 4568 a No. 46 side-board to be sent direct to our customer James Oakley Pocahontas Mont. Our customer wishes this sideboard at the earliest possible moment and we have promised to hurry it as much as possible.

Total errors.....

Advanced test—8 *minutes.*

3. Insert apostrophes, commas, colons, semicolons, and periods where needed in the following:

Please send the following as soon as possible 1 doz ladies white linen handkerchiefs the best value you have at about 15 c each 6 cakes of glycerine soap 15 c a cake 6 for 50c a box of ladies cream note paper and envelopes rough finish unruled about 25 c or any special value you have of this grade.

Remember I cant teach you how to run your business I cant show you how to get dollars from letters dropped in a rat-hole but I do know what human nature is and perhaps you dont and I do know how to line up words so as to make people send you business so far as words will do it.

Errors in advanced test.....

Full punctuation, add elementary and advanced.....[1]

[1] CODY, SHERWIN, *Commercial Tests and How to Use Them*, World Book Company, Yonkers-on-Hudson, New York.

Letter Composition

The best sort of test in this connection is to require the person to write about some subject with which he is perfectly familiar. Most letter-writing tests require the applicant to write a letter applying for a position, because his own business experience is a subject with which he is assumed to be familiar. The length of the letter desired should be stated—usually a hundred words are sufficient. The time allowed for the test should be approximately ½ hour for beginners and 15 minutes for advanced letter-writers.

The instructions may either be written upon a blackboard, printed on the test sheet, or given orally, but in every case they should be specific, somewhat as follows:

> You are to write a letter of application for any position you believe you are fitted for. Your letter should contain not less than 100 words, though the number may be more, and should state fully:
>
> 1. Your education.
> 2. Your experience.
> 3. Your ambitions.
>
> You will be graded according to the neatness and form of your letter, the spelling, punctuation, and paragraphing. Attention will also be given to your choice of words and clearness of expression. Also give in your letter:
>
> 4. Age.
> 5. Sex.
> 6. Color.
> 7. Physical strength and health.
> 8. Appearance.

In grading such a test, particular attention should be given as to whether or not each of the eight facts requested in the instructions is properly covered in the letter. If any are omitted, ascertain the reason therefor, as it may be indicative of something important.

Test for General Information

Such test may or may not be of value, but where it is decided upon, it should be made to include such information as is of value to the work. In making it up, the questions should be graded as previously suggested for spelling, and sentences should be arranged with several answers, only one of which is correct.

Typing Test

In every such test, care should be taken to use the particular machine with which the applicant is familiar; otherwise the fairness of the test is vitiated by the strangeness of the machine.

This should be a standard letter which contains most of the difficulties to be encountered in the ordinary correspondence work. The applicant, when given the letter to copy, should be allowed ample time to insert and adjust the paper and type the name, address, and salutation. When this has been done, the typist should be told what is expected from her and given the word to go. The letter should contain a definite number of standard words, which means that each five-space unit is called a word. Ten minutes is sufficient time to allow. Mistakes may be counted as follows: Each wrong word or word omitted counts 5; each mistake in capitalization or punctuation, 2; each smudge, 2; and from 5 to 10 for poor margins and unsightly distribution. In addition, a certain allowance should be made for the time consumed as compared with a definite standard.

Tests for Stenographers

Considerable experience is required to dictate at a uniform rate of speed, and in giving such tests it is important that the speed be varied in accordance with the speed of the stenographers. The best way to do this is to divide into several parts the letter to be given, then learn to dictate the first part at 60 words a minute, the second at 75 words, the third at 90, the fourth at 100, and the fifth at 125. It will take some practice to acquire this ability, but, once learned, it will be possible to grade the taking speed of the stenographer with great accuracy. Even a poor stenographer should be able to take the dictation in the beginning, and, provided the dictation is clearly enunciated, she should only fail at the limit of her speed.

A context test is also valuable in testing stenographers. It consists of a sentence or sentences in which one or more separated words are missing from the text, the applicant being required to write such missing words in the space denoting their omission; any word that will make sense must be counted as correct. For example: "The poor baby.....as if it were.....sick." The peculiar value of such tests for

the stenographer is that she will, in the course of her work, often find it necessary to substitute a word for one which she cannot read in her notes, and, if she is apt at such substitution, the chances are that she will read her notes all the more readily.

Arithmetical Tests

These should include examples in addition, subtraction, multiplication, and division. For each subject provide 10 or 12 examples, all of which can be done by a very good clerk in 3 or 5 minutes. Do not expect a beginner to complete them all. Grade by the accuracy and speed, counting only the correct performances.

Bookkeeping Tests

In addition to arithmetical tests certain others should be given, designed to show the familiarity of the applicant with simple double-entry bookkeeping. If such calculations as figuring percentages and discounts form part of the work, simple examples can be prepared for this.

Filing Tests

A test for filing can be arranged by having 25 slips or cards about 3 by 5 inches in size, and numbered from 150 to 175, each of which contains a name and address. The applicant can be directed first to arrange them in alphabetical order. When this operation has been marked and graded, the applicant should then be directed to arrange the cards in geographical order—alphabetically by states, then alphabetically by towns within the state, and finally, alphabetically within the town. The final test should be the filing of the cards numerically, as shown by the numbers on the front.

How to Construct a Trade Test

Considerable progress has been made in the preparation of testing materials available to the office manager. Before constructing his own tests, it would be well for him to see what others have done, and what results they have secured. By so doing, much time can often be saved and faster progress made.

To the individual who wishes to construct his own tests, the following suggestions, based on sound experience and extended observation, will be of help:

1. Make a list of the essential capacities required in each occupation for which it is intended to prepare tests. Even for those occupations in which the capacities are most numerous and varied, the list of essentials can be appreciably reduced.

2. Grade these essential capacities in the order of their importance for the occupation.

3. For each capacity make a list of things a knowledge of which is necessary, calling largely on those which are used in the work, but omitting those which are purely technical and which an applicant for the position cannot be expected to know; for such things he can learn after being engaged. This knowledge is more or less in the class with tools of a trade, and forms the basis for the test. The applicant may not yet know which screw to turn, but he knows how to operate a monkey wrench.

4. Make up tentative tests. Endeavor in all cases to have all questions in each test graded according to their difficulty, placing the simplest first.

5. Put a "shock absorber" in the test. It has been observed that many nervous people in taking the tests feel certain they will fail, and such people cannot do themselves justice while that mental state persists. So the psychologists have devised a shock absorber, consisting of a very simple question on a subject, that anyone can easily answer. When nervous persons come to this question, they feel reassured and probably say to themselves, "This isn't going to be nearly so hard as I thought it would," so they recover their mental poise, and, as the questions gradually increase in difficulty, they are able to answer them to the utmost limit of their intelligence and information. Were it not for the shock absorber, many nervous, though still very capable, people would abandon the test in despair.

6. Try out the tentative tests on clerks of known ability, by going to the departments where clerks of the kind to be tested are working, and giving them the tests. Then ascertain from the head of the department which are the most and least efficient clerks in respect to the matter being tested. If the test has been properly constructed, the most efficient clerks should secure the highest ratings, and the least efficient, the lowest (though the intermediate grades may not entirely agree); but if this is not the case, the test must be gone over again and again until one is devised that gives this result. If the proper results do not come

from the first trial, there is no reason for discouragement, as the best test makers have had to reconstruct their tests many times. As an instance of this, some of the army experiences in this work showed that the best psychologists in the country prepared tests which did not bring the expected results on the first trial, and which had to be reconstructed.

7. Give the test decided upon to clerks who are known to have good work records, and time the operations carefully. Compare these results with those obtained from other efficient clerks, and from the data secured set a time limit for doing the work. This time limit should be of a character such that only the very best workers can complete the tests within it.

General Considerations

Making employment tests is not a task that can be completed in a few days—it is a lengthy process requiring a considerable period of time. Inasmuch as there is not sufficient time to make a test when employing new help, the work of constructing tests should be taken on as a major assignment by some person selected by the office manager, and until the chief tests are prepared, this person should be relieved of all other duty.

A number of these tests will be found to be suitable for several positions. Grammar, spelling, punctuation, arithmetical calculation, and so forth, are needed in a number of occupations, and these tests should be so designed that they will serve for the several positions.

The tests, when completed, tested, and found satisfactory, should be standardized. They can be multigraphed or mimeographed on standard sheets, and complete instructions for giving, grading, and marking them should be prepared also.

The job-specification card should contain a list of the standard tests which are to be given for each positon, so that the employment manager can, without difficulty, select the right material.

The tests should be given in a private room, altogether apart from other work going on in the office, and this room should be well lighted and ventilated. Cramped or crowded conditions should be avoided and everything possible done to put the person being tested at his ease, for only so can his best efforts be brought forth.

The examiner should be a person of natural tact and diplomacy, one who is able to put an applicant at ease quickly. No dictatorial attitude should be permitted. All instructions should be given clearly, in a moderately quiet tone, and the examiner should not hesitate to repeat his instructions if they appear unclear. It should always be remembered that the purpose is to *discover* whether or not the person being tested possesses certain capacities—not to surprise that person into making mistakes. If the tests have been correctly constructed and are given under such conditions, the actual ability of applicants can be determined with reasonably satisfactory results, and the tests themselves may confidently be regarded as successful. There will be some exceptions, since no test can always be perfect. And it should always be remembered that a test is a supplement to the interview, never a substitute for it.

The National Clerical Ability Tests

Considerable interest is manifested in the National Clerical Ability Tests, which are administered by the Joint Committee of the National Office Management Association and the National Council of Business Education. These tests are the outcome of an attempt to devise a more effective plan for testing the vocational abilities of pupils who expect to obtain business employment and to establish a national accrediting agency which may adequately serve employers seeking competent office workers.[1]

For many years office managers had felt that the graduates of high-school commercial courses were not all they should be. In an endeavor to find the reasons and remedy them, if possible, two factors were discovered as probably largely responsible for the situation. One was the inability or unwillingness of schools to restrict vocational business training to those able to profit by it; because of this fact, many "graduates" lacked the aptitude for and interest in office work.

[1] For a comprehensive report on the genesis, development, and early progress of the National Clerical Ability Testing program, see the report of the Joint Committee in the Tenth Yearbook of the Eastern Commercial Teachers' Association, 1937, pp. 1–289. Additional information may be obtained from the Joint Committee on Tests, 13 Kirkland Street, Cambridge, Mass. to which we are indebted for many of the details here presented. Specimen tests are available from the committee at low cost.

It was also found that business educators and business men did not altogether agree on the subjects that should be taught to vocational business students, how they should be taught, or what ability should be expected. This was really more a lack of understanding of the problem than a disagreement.

By setting up the program of testing the clerical ability of public and private business school graduates on a uniform nation-wide basis, it was expected that two primary objectives would be attained, and in attaining them, another objective would be accomplished. Since success in passing the tests would depend upon better selection of young people for training, and likewise upon a better training for them, it would be expected that a better-trained graduate would be produced.

OBJECTIVES OF THESE TESTS

The complete list of objectives follows:[1]

1. Provide an authoritative device, somewhat comparable to the College Board Examinations, for use in measuring the qualifications of public and private business-school graduates for some of the more common office occupations for which vocational training is given.

2. Assist business teachers and others who are responsible for vocational business-training programs in attempts to bring their course offerings and testing procedures more into line with sound principles and practices in the field of vocational education.

3. Assist educators in their attempts to insure for vocational business courses students who possess the aptitudes, interests, and abilities required for the kinds of work for which they seek pre-employment training.

4. Provide employers of office help with a better means of appraising the qualifications of applicants for clerical positions, and to provide a certification plan which will, to some extent, obviate the necessity of giving employment tests to applicants who have graduated from public and private business schools and colleges.

5. Focus attention of employers of office help on the need for definite standards of competency for beginners in certain office occupations, and to emphasize the fact that job analyses should be made to determine just what is required of beginners.

[1] From Joint Committee on Tests, *Bull.* No. 2.

6. Encourage employers—especially office managers—to come to some agreement as to pay-roll names for common types of office work, so that a common language may be spoken when clerical jobs and training for them are discussed.

7. Set up standards of achievement at which trainers of office workers may aim in setting up programs of training.

8. Bring office managers and other employers of clerical help into a closer working relationship with business educators in public and private schools.

The results of the testing program indicate that many of the objectives are being realized, even if not to the full extent. As the value of the tests becomes more and more evident, it is expected that the success of the program will be reflected in the increasing number of public and private business-school graduates who will be able to step into an office and start work intelligently and capably.

SUBJECTS INCLUDED IN THE TESTS

The plan of the National Clerical Ability Tests program is to have tests carefully prepared covering the following: stenography, typing, bookkeeping, machine calculation, machine transcription, and filing. In addition to these subjects, tests are prepared on general information and business fundamentals, plus a personality-rating schedule.

The *general-information* test samples things that may have been acquired through school courses, or observation, or both, and is taken by each examinee. The *fundamentals* test covers spelling and English usage, business arithmetic, and business information, and is taken by each examinee.

These tests are sampling tests. Each is made up of samples of the major kinds of work which the occupation it represents seems to require. A test of this kind is harder to administer than are short "speed" tests; it takes more time and materials. But it may be shown to be more effective as a means of stimulating greater attention to sound vocational training and as a means of measuring clerical ability at the time of initial employment.

HOW OCCUPATIONAL PROFICIENCY IS TESTED

The *bookkeeper* test is built on the assumption that a bookkeeper must be able to *keep books*—not merely to post, or record

sales, or enter cash items, or do other routine clerical work. Hence, a comprehensive problem which runs through the bookkeeping cycle is used for this test. Three hours are allowed for it. This test, therefore, results in an index of the examinee's ability to complete the bookkeeping cycle based on a series of transactions to be entered in a going set of books—not merely a score on an objective test of principles.

The *stenographer* test is built on the assumption that a stenographer must be able to take ordinary dictation for reasonably long stretches at a time and get out her notes promptly and acceptably. Hence the candidate is subjected to a 40-minute dictation test and a 2-hour transcription test. Only usable transcripts are accepted. Real dictation, not reading, is the basis of the test. This test results in an index of the examinee's ability to take sustained dictation and get out usable transcripts up to a reasonable standard for a day's work—not merely a score in terms of so many words a minute *taken* in a few minutes.

The *typist* test is built on the assumption that an all-round typist, as distinguished from the mere copyist, must be able to turn out all kinds of typing rapidly and accurately and in good form. Hence a 2-hour production test is made up of samplings of 8 or 10 typing jobs common to all offices. Only usable work is accepted. This test results in an index of the examinee's ability to handle the more complex typing jobs—not merely a score in terms of copying speed at so many net words a minute for a few minutes.

The *machine transcriber* (or machine stenographer) must be able to turn out a good volume of acceptable work throughout a substantial period of time every day. Hence this test requires the examinee to transcribe a soft wax record acceptably as to quality of work done and time consumed. Only usable transcripts are accepted.

The *calculating-machine operator* must be able to handle a variety of computations rapidly and accurately, and maintain a satisfactory pace by the hour. Hence, a 2-hour production test, made up of samplings of computational work common to many offices, is used. Only correct computations are accepted.

The *file clerk* must know the commonly accepted principles of filing, be familiar with commonly used filing equipment, and be able to handle a reasonable volume of filing material over a sub-

stantial period of working time. A test of principles is used, also an actual filing test in which each examinee files carefully selected material. A 2-hour time limit is set for the test.

Thus it is seen that these six tests are intensely practical, that training for them should be equally practical, and that one who succeeds in one of them will be likely to succeed in a position from which its materials are drawn. They are production-speed tests, not simply spurt-speed tests. In all cases an attempt is made to simulate actual working conditions.

WHERE THE TESTS ARE GIVEN

Test centers are selected in various parts of the country, determined largely by the applications received. The tests are given on the same days in all centers, near the end of the school year, on dates announced well in advance. The tests are carefully administered and rigidly controlled.

A student may request examination in one or more vocational subjects, but all examinees must take the tests in general information and fundamentals. Prospective examinees in school are selected by the school authorities early in the fall, so that the personality rating schedule may be kept during a substantial part of the school year. But any student or other person who believes himself competent to perform the duties of one of the jobs covered, and who would like tangible evidence of his competence, may take the test desired by paying the required fee and enrolling in any center where the test is given. A worker who wishes to change jobs and has prepared for the change would find these tests helpful in appraising his readiness for the new position.

Employers who wish to measure the relative productiveness of present or prospective employees for salary adjustments, or other reasons, would find these tests helpful. In short, the Joint Committee invites anyone who has good reason to want to know how well prepared he is for one of the jobs covered to enroll for the test covering that job.

Supplementing the efforts of the National Joint Committee of office managers and business educators is a local committee of at least two persons in every community where there is a branch of the National Office Management Association—one business educator and one office manager, working together for the development of the program both locally and nationally. In

cities where there is no branch of the association local committees may easily be formed, starting with a nucleus of one office manager and one business educator.

TEST CONSTRUCTION AND SCORING

The exact steps taken in the construction of the tests vary somewhat from year to year, but at all times care is taken to see that they conform to sound test-making procedures. In general, the following steps are taken:

1. Copy is prepared by an outstanding worker in the field.
2. The copy is edited by the technical adviser of the committee.
3. The revised copy is submitted to representatives of the National Council of Business Education and of the National Office Management Association for further suggestions and criticism.
4. A preliminary form of the test is printed and tried out on a representative sample of secondary-school students, workers, and others.
5. The try-out results are analyzed. For each skill tested this analysis includes a study of the reliability of the scoring procedure. For the true-false and multiple-choice tests, this includes an item analysis with a consequent discard of all items lacking a satisfactory discriminating ability.

All scoring of test papers is done in the central office. Papers are rated with two things in mind—accuracy in accordance with prescribed standards, and uniformity. Every effort is made to insure these two things by carefully training those who do the work, supervising their work, and reviewing marginal cases. The scoring of the general information and the fundamental tests is done by a scoring machine which gives an instantaneous result for each test paper.

PROVISION FOR RECOGNITION

Certificates of proficiency are awarded to successful candidates by the joint committee; these certificates should be recognized as evidence of occupational competency when presented with an application for the office position for which they are issued. At the same time, the joint committee admits that it is not possible to state that, simply because one has achieved a certain composite score on the test, he will succeed in the position for which he has been tested, or that one whose score is below a given point will fail. There are many unknown factors which contribute to the

examinee's success or failure; there is no way to measure or weigh some of these factors in ascertaining their effect or value in predicting a score of occupational success. All that is claimed for the tests is that they are true samples of office work, and that anyone who handles them well, should, other things being equal, have little difficulty with actual office work of similar nature.

Questions for Discussion

1. What is the purpose of a trade or occupational test?
2. Explain the "trial-and-error" method of employment. Why is it the most costly employment method in existence?
3. What is an unstandardized test? Why is it unsatisfactory.
4. What are some essential considerations in constructing tests?
5. What is the primary test for all office work?
6. Comment on the make-up of a test for spelling ability.
7. What should a test in grammar include?
8. Comment on a test in punctuation.
9. What is a good test in letter composition? Do you agree that this is the best sort of test? Why or why not?
10. Comment on a test for typing ability.
11. List seven capacities for which a typist could be tested, and comment briefly on each.
12. What sort of test is suggested for stenographers?
13. What is a context test for stenographers? Why is such a test valuable?
14. Comment on arithmetical and bookkeeping tests.
15. How could a test for filing be arranged?
16. How would you construct a trade test?
17. What is a "shock absorber" in a test, and what is its purpose?
18. How would you test a test before giving it to applicants for employment?
19. Mention several general considerations in making and giving employment tests.
20. Comment on the requirements for a good examiner.
21. Explain the purpose of the National Clerical Ability Tests and state how they are prepared and administered.

Problem

How would you devise a test for the following position?

Credit authorizer in department store. Each charge customer's name and ledger experience are recorded on a visible index, and, when a "take-with" sale is made to such a customer, the sales person communicates with the authorizer, who looks up the name on the card list and, if favorable, authorizes the credit. At times there is little to do; but at certain hours of the day, requests come along fast and furious. Mistakes are quite serious. If credit is refused to a good customer, that customer is lost to the store, and if granted to one who has been proved to be poor pay, a loss may be incurred. Work is done entirely by artificial light.

XIX

EMPLOYMENT AND TRAINING

If the office is sufficiently large to make it profitable, there should be a special employment office in charge of an employment manager, but as most offices are small, this procedure is not always profitable. As a rule this function is performed by the office manager himself, but occasionally an office will be found where each department head employs the help for his own department. This latter plan is defective, for the following reasons: (1) there can be no uniform employment policy where so many different people hire employees; (2) new employees are often hired in one department, while others are letting persons go who would be competent to fill these vacancies; (3) there is no opportunity for specialization, and the hiring of help demands a person with both tact and experience; and (4) there is no opportunity to establish centralized employment records.

The functions of employment and discharge should be assigned to one person. By this it is not meant that a department manager should be debarred from saying whether or not any given person shall work in his department. If he objects to such a person, he can refer him to the employment manager with recommendation for discharge—from his department. The main reason that discharging should be done by the person who hires the employees is that it can be done more tactfully, also more calmly and deliberately. Usually the department head who desires to get rid of an employee has been irritated beyond control by the circumstances impelling his desire, and, when he is in such a frame of mind, he should not attempt to discuss the matter with the person he desires to have discharged, for interviews of this kind are not exactly calculated to improve the morale of his department.

Experienced Clerks

These are always in demand, as compared with beginners, though it is by no means a demonstrated fact that the experience

which most of them have is of any value in the new position. The office manager whose policy it is to employ beginners and, after training them in the ways and policies of the company, advance them to higher positions, will always operate his office more economically and with much better results than the one who, in order to save himself the expense of training, is always in search of someone who, he persuades himself, "has just the experience wanted." That policy usually resolves itself into a continual string of disappointed hopes, though here and there a "lucky strike" keeps hope alive.

Job Specifications

The job analysis described in a previous chapter having been worked out, it is a simple matter to prepare a job specification therefrom. If there is no such analysis and an employee is nevertheless needed, a job specification should be prepared from an interview with the department manager requiring the employee. The interviewer should endeavor to get specific information as to the capacities required and should not be satisfied with a general statement that a "first-class experienced clerk" is required.

The Waiting Room

First impressions are usually lasting, and employment work should be so planned that the first impressions of the new employee are favorable. The employment office should not be tucked away in some dark and poorly ventilated corner of the building, where it is necessary for the applicant to grope about half blindly, looking for it. Seats should be provided for a number of people, so that they may be comfortable while waiting. There should also be a private room attached, in which the actual interviewing can take place, so that the applicant does not feel nervous in telling his story, as he is likely to feel if other applicants are sitting within hearing.

Interviewing the Applicant

The interviewer should possess tact and diplomacy and, when dealing with an applicant, should speak as an equal and not as an arbitrary personage doling out favors. He should put the applicant instantly at his ease, and this he can do by some casual

remark instead of commencing in an abrupt, brusque manner of speech. If it is expected to get a deliberate, well-conceived judgment of the applicant's possible capacities beforehand, a brusque, dictatorial manner will either confuse him or irritate him so that he will reply in kind, and the interview will be wasted time.

The applicant should be given a full and ample opportunity to state his case before the questioning begins, as this will enable him to compose himself, and because he is speaking on a subject with which he is familiar he will speak more easily and frankly, while at the same time his recital will give a better lead for the questions which are to follow.

When his story is finished, the questioning should begin, and the formulation of these questions should have been carefully studied and experimented with beforehand by the interviewer. They should be put in a matter-of-fact manner, and no attempt should be made to trip the applicant.

When the interview has progressed sufficiently to convince the interviewer that the applicant may be a promising subject and one to be considered for employment, the interviewer should use an information form to record his impressions. On this he should first write the name, address, age, sex, nationality, education, and previous experience of the applicant, and then his impressions. Sometimes a predetermined code is used for this purpose, or the code can be printed on the form and checked off by the interviewer.

The Application Form

A showing of a sample application form has purposely been omitted, as in our opinion each employment manager should prepare his own.

In the construction of such a form, analysis is necessary to determine just what information is valuable. One very necessary piece of information is the telephone number, so that the applicant can be located quickly when wanted, if he should be selected from a number of applicants interviewed over several days. When all the information needed during the interview and consideration of the applicant's qualifications has been listed, the construction of the form should follow the general principles already given for the making of forms of any other kind.

Giving the Tests

After the interviewer has obtained the desired information, or after the application form has been filled out, psychological or trade tests, if desired, can be given. If there is no intention of employing the applicant, he should not be required to fill out the application form, or take a test, though such a routine is practiced by many interviewers who dislike to disappoint an applicant.

The applicant should be informed that the company gives the tests for the purpose of finding the work for which he is best fitted and asked if he has any objection to taking it, but the latter question should not be put to him in such language as to convey the suggestion to his mind that he has objections, or that the test is usually objected to by other applicants. On the contrary, some explanation should be given him of the nature and purpose of the tests, and the advantage from his standpoint as a prospective employee, in that the company, through these tests, places him in a position where he is most likely to make good.

If the tests are not to be given by the interviewer, the applicant should be conducted to the classroom where they are given and personally introduced to the examiner. This little courtesy is generally appreciated by the applicant and will tend to put him more at his ease than if he were merely directed to "go to room 48."

The examiner should be informed that the application is being made for a certain position, and the job specifications, with the specific tests to be applied, should be given him. Only those tests that apply should be given, unless the examiner has reason to believe that the applicant possesses other desirable capacities.

The Question of References

Whether any consideration should be given to references is a debatable question. It is well recognized that no applicant for employment gives as a reference a person that he knows will not speak well of him, so that, from his standpoint, references have to be considerably discounted. Again, very few men are inclined to speak ill of a person who has left their employ, unless the separation was caused by some flagrant act, such as deliberate dishonesty—which, on the whole, is rare. The typical letter of

reference does *not* read: "The young lady in question proved quite unsatisfactory. Her mind appeared to be on other things besides her work, and she spent a great deal of our time either in the wash room or gossiping with other employees." Very seldom does one get that sort of reference, and if one did, naturally it would not be shown.

However, if a reference is required, it should be followed up, either by a personal interview, or by a personal (not a form) letter. This letter should ask for specific information and should not deal with generalities.

Executive Positions

Asking a person to fill out an application form for an executive position is not of much value, and there are not many tests which can be applied for such positions. Walter Dill Scott recommends the mental-alertness test and similar intelligence tests but does not claim that they gage, to any extent, the capacity of a person for a specific executive position. The best practice at present devised is to have such men interviewed by a number of executives in turn, and have each record his impressions, but in any case the applicant should be interviewed several times. At the first interview he usually tries to "sell" himself, is on his best behavior, and puts his best foot forward, seeking to make a favorable impression—in which he usually succeeds. At the second meeting he, being acquainted with the interviewer, does not so obviously try to sell himself, and the latter can usually see much further into his real characteristics than was possible at the first interview. On the third interview the applicant shows still more of his real self and can be judged more fairly.

The Qualification Card

For each newly engaged employee, a qualification card should be written out, containing, besides his name, address, telephone number, and similar information, all other facts which have a bearing on his relation with the company.

His physical qualifications, such as age, health, height, and weight, should be recorded on the qualification card, together with any physical limitations or disabilities.

His educational qualifications should also appear there; the number of years of schooling he has had, and any after

training, such as trade schools, correspondence schools, and so forth.

Technical ability and capacities, as revealed by the employment tests, should also be recorded.

The full story of his business experience should also appear. If he has any special hobbies, plays games, participates in athletic sports, or possesses any similar qualifications that might be of interest in connection with the activities of employees in the company, these things should also be noted.

Finally, any special qualifications which may have been observed in him by the interviewer should be noted on the qualification card.

All this information should be placed on the card at the time of his engagement, and in addition, space should be provided on it for the following:

His history with the company—positions held, salary earned, reasons for transfer, promotion, and so forth. Record for attendance and punctuality. Suggestions he has made through the company's suggestion system; those which have been adopted. Complaints also; those which were well taken, and those which passed unnoticed. His desires and ambitions, as learned by interviews with the department manager, should be periodically recorded. Such a card, which of course should be specially prepared for every individual office, will be found of particular value in considering the employee for transfer or promotion and may act as a deterrent in preventing his hasty and ill-considered discharge.

Every employee should be regarded as an asset, for money has been invested in his employment and training, with the idea that he will earn dividends for the company on that investment. It is just as important, therefore, that the company keep a careful inventory of this asset as of any other, and watch for its development, as upon the development of all its assets—this one included—the success of the company depends.

Introducing the New Employee

After an employee has been engaged, he goes to work and his introduction to the job and to his fellow workers is a matter of no small import. Statistics show that a very large number of the quitters leave their positions during the first week, and

sometimes even on the first day. The chief reason for this is that the employee contracts a dislike for the place, the position, or his fellow workers and quickly deserts, moved thereto by his initial impressions, which after all may be only trifles in themselves but seem most important in new surroundings. Knowing this, it is therefore customary in many places to give considerable attention to the initiation of the new employee into his position. At first the interviewer has a very frank conversation with him in which he explains that having now joined the company he is entitled to know something of its history and policies. The

CONTENT OF AN OFFICE MANUAL

I. The history of the company.
II. The policy of the company in its dealings with others.
III. The office rule book, covering:
    Office hours.
        Punctuality.
        Overtime.
    Vacations and holidays.
    Salary payments.
    Changes in addresses.
    Personal calls.
    Ordering supplies.
    Use of telephone.
    Use of messenger service, and so forth.
IV. Departmental standard practice.
    Covering the standard methods of performing work in the department.
V. Departmental current practice.
    Covering the current method of performing operations which have not been standardized.
VI. Individual standard practice and current practice sheets.
    Covering the particular instructions for each employee's job.

Every office should possess a complete office manual, covering the company's policy and instructions on the above subjects. Such a manual will naturally form a series of pamphlets or sheets, and no one clerk will have all of them. Each clerk, however, should be furnished with Secs. I, II, III, and VI.

existing company rules are also explained, the newcomer being acquainted with what the company desires its employees to do and what it does not permit. After this friendly conversation, the new worker is personally conducted through the office, or at least such portions of it as he will have occasion to visit; he is shown the lunch room, the rest room, toilets, lockers, and so forth, and then introduced to the head of the department in which he is assigned to work. This executive has a preliminary friendly conversation with him and then introduces him to the other workers. After this, the training clerk—to whom he has by this time been introduced also—takes him in hand and begins to explain the new job. At noon, some particular employee in the department, known for his qualifications as a "good mixer," goes to lunch with him, introduces him to the other workers, and initiates him as far as possible into the fellowship of his associates. The new worker, treated in this hospitable and friendly manner on the very first day, is likely to respond to the welcome he receives; his strangeness quickly wears off, and he feels that he has at last gained employment in an office where his work is going to be appreciated and is mentally at his ease with both his surroundings and associates—a highly desirable condition.

Contrast this reception—and it is both sincere and inexpensive—with that of the clerk who is assigned to a desk and expected to start work with hardly a word of advice or explanation, to say nothing of welcome. Surrounded by strange people to whom he has not been introduced and who take no notice whatever of his presence, it can be easily imagined what feelings begin to grow in his mind concerning the company, the office, the people in it, and the job in general. He is a stranger and is allowed to remain so; he feels embarrassed and hesitates to ask even the simplest question. At noon he sneaks out by himself to lunch—and perhaps never comes back again.

Unfortunately, this latter picture is more true of the average office than is the former, and is responsible for much of the turnover among newly hired employees.

The Follow Up

After the new employee has been properly introduced to his job and his associates, the interest of the company in his welfare

should not be permitted to relax, for it is important that the newcomer should as soon as possible be made one of the office family. At first no special and obtrusive efforts should be put forth, as it should not be too evident that the company is purposely trying to make him feel at home—otherwise the object may defeat itself, and the worker himself to some extent become spoiled. The person delegated to take him to lunch, or introduce him to other employees, should also suggest such employee activities as may exist, and he should be invited to join and take part in the games. The librarian should endeavor to interest him in the books which the company has to offer, and, if there are any social activities, someone in one or other of the clubs should invite him to join. In the beginning, the company should take no part in this, but after two or three weeks the employment or office manager should make inquiries and, if the newcomer has not taken part in the company activities as much as desired, should tactfully endeavor to find the reasons why, though of course no semblance, even, of compulsion should be shown. It may be that the person is following some particular hobby of his own, as perhaps may be gleaned from his qualification card.

This sort of follow-up work is especially valuable with a new employee, as it helps him over the initial—which is always the hardest—part of his work. As soon as this is accomplished, the official efforts should cease and the worker be left to his own resources for these matters.

Record of Reasons for "Quits"

Clerks, who for one reason or another are constantly leaving—and this happens in most if not in all offices—are often the unconscious custodians of some of the most valuable facts in office management. There must be some reason for each such change, and, whether or not it is a valid one, it is a manifestation of unrest and dissatisfaction. Employees, however, are usually allowed to quit with little investigation of their reasons, and very rarely are such reasons tabulated or considered as sources of dissatisfaction that should be stopped if possible.

The individual thus quitting should be interviewed by the person in charge of the employment, and this work should be done as skillfully and tactfully as possible. The true reason is seldom given if the department or section manager does the dis-

charging, and this fact constitutes another argument for the performance of the discharging function by the person who employs. Even under the best conditions, the true reason is difficult to discover. Of course, if the quitting is on account of marriage, sickness, or some other apparent and unavoidable cause, it is readily accounted for, but it is not necessary for the management to tabulate these reasons for consideration, though they must be counted in the total.

The following are some of the usual reasons for leaving:

Larger salary offered.	Incompetence.
Better business opportunity	Health.
Hours too long for health.	Real or fancied grievance.
Hours too long for salary.	Marriage.
Late and uncertain hours.	Morals.
Night work.	Dishonesty.
Insubordination.	Temporarily employed.
Poor attendance.	School.
Monotony of work.	Resumes former position.

Most employees, when quitting, will, if tactfully approached, give what appears to them the true reason for their quitting, and, when a collection of these reasons has been made and studied, it will frequently give the management a key to what may really be serious defects in the organization as regards employment conditions especially, and possibly other conditions indirectly connected with them. Thus, if many employees are discharged for incompetency, the employment methods may need investigation; insubordination might bring up the question of whether or not the office management might not to some extent be provocative of it; leaving for larger salary would raise the question of sufficiency of salaries, and in fact most of these causes in one way or another suggest some office problem for consideration. The value of such a tabulation used in this manner is at once apparent.

Plans for Determining Causes of Dissatisfaction

Dissatisfaction, unless manifested in open rebellion, is rarely reported by employees to the management. It is something rather to be concealed, though at best the concealment is never fully effective, and its indications can be readily detected by an observant and discerning manager.

When there is a general perceptible lack of interest in the work, manifested by an appreciable group of clerks, it may be

fairly assumed that in some way or other the management is at fault.

When disciplinary rules are generally disregarded, the fault may be in the rules themselves—they may be stricter than necessary, impossible to enforce or too difficult to follow, or it may be their nonobservance is in itself an indication of general dissatisfaction.

When a lack of cooperation is perceptible, it may be traced to dissatisfaction.

If the employees appear to take no interest in any social recreations, such as clubs, games, athletic sports, and so forth, the management may have provided for them, this is almost an invariable symptom of dissatisfaction.

Portents like the above should warn the company that there is something wrong, and an investigation should be set afoot before the dissatisfaction has had time to spread, for dissatisfied employees are not good dividend producers for a company. It will be generally found, too, in such case, that the employees are not necessarily and wholly wrong, and that the situation is not due to pure "cussedness." More frequently they will be found to be on the whole decidedly right, or at least to have just cause for their dissatisfaction, and it lies then with the management to rectify the condition.

To locate incipient dissatisfaction, a staff member should make a periodical check.

First, he should possess knowledge of things of a physical nature that are likely to cause discontent, such as dirt and disorder, unsanitary conditions, machines out of repair, bad lighting, and so forth. All such things should be listed on a standard checking list, and every one of them should be investigated and reported upon.

Second, he should spend some time in the department, observing the employees at work and watching particularly for any of the symptoms above mentioned.

Finally, if he is able to do so tactfully, he should engage some of the employees in conversation and endeavor to draw them out. Much information can be gained this way by a tactful and sympathetic executive.

An investigation of this sort should be made about once a month and will be found profitable in many ways. But it

should be made by a member of the office manager's staff, as no report from section heads on this matter will suffice.

Salary Standards

The standardization of salaries is a most important element in office management, as detailed in the next chapter.

First, salaries should not be below the market rates. It is possible to determine what these are for certain standard positions by inquiry from employment agents—especially public ones—from schools, and through correspondence with other companies. It is also possible to discover from employees who are leaving for higher salaried positions, where they are going, what kind of work they are to do, and thus get a general idea of the salary question. If the results of these investigations show that the salaries paid in the office are below market rates, they should unquestionably be raised.

For achieving the best results in quantity and quality of output, salaries should be rather a little better than the current market rates, as this will naturally attract the best help procurable.

In this connection, it may be noted that employees will usually work for a large office for less money than they will for a small one, knowing that the large office holds out better opportunities.

In the second place, salaries should not be unnecessarily high, and it is folly to pay exorbitant ones on the theory that thereby the best help will be secured.

For every position there should be a maximum and minimum salary—the latter to be a figure which will attract the proper grade of employees. The maximum should be the amount that the company can afford to pay for a certain kind of work, and beyond this nothing is gained by increasing the salary. This should not be construed as meaning that where payment is by results, employees should not be permitted to earn large bonuses.

Finally, there should be standard salaries for similar positions. That is to say, a clerk of a certain grade, doing a certain kind of work, should be paid a sum within a certain definite and prescribed salary range.

Turnover of Employees

Labor turnover designates the relation between those on the average pay roll and those who have left the organization. Thus,

if there is an average pay roll of 100 clerks, and 50 left during the year, the annual rate of turnover is 50 per cent. There is no question that this represents a serious loss. It has been variously computed that it costs from $50 to $100 to train an office employee, a cost that includes hiring, training, errors while learning, loss of output while learning, and so on.

General average length-of-service figures serve as a good barometer of conditions in this respect, though such an average, to be still more indicative, should be computed by taking into consideration those who were on the pay roll during a certain period, rather than taking the figure on any given date.

A zero rate of turnover is an impossibility over a period of years, for deaths, marriages, and other unavoidable causes prevent it.

It is a good plan to keep a monthly running average rate of turnover by departments, for this will show the location of the high and low turnovers as well as the general condition of the office in this respect.

Training Methods

The old method of training office workers—if it could be considered training—was simply to place the new clerk at a desk, give him some papers and a few moments' instruction, and then leave him to his own devices. When he made an error—as he was certain to do almost at the start—and it was discovered, he was promptly disciplined for it verbally. This process was continued day after day, the clerk blundering ahead and learning what he could from his own mistakes, until he had "picked up" the work, as it was called. Some "caught on" quickly, but others gave up in despair and sought another office; still others were "fired" by the disgusted department head, and the process began all over again with other new employees. These methods, unfortunately, have not been entirely abolished.

At present even the smallest office can delegate the training of new employees to one of its members and profit greatly thereby.

Preliminary training regarding the company's policies, rules, and general methods is mainly acquired in the course of the regular work, though occasionally some concerns accelerate the process by instituting weekly or semiweekly class instruction for an hour or two at a time.

Training for the Special Work

If the work is highly standardized—as it should be—it is imperative that each person do his work in the standard way, and this naturally involves special training. If the method is standardized, that is, standard motions and layout written out for guidance, or in other words, written standard-practice instructions, it is possible to perform this training work both quickly and effectively.

Stenographers and typists usually come to the organization partially trained—they may have had experience elsewhere, or they may be fresh from a school in which they have acquired the rudiments—with perhaps some details of their occupation. In such cases the instruction would take the form of intensive training in the forms and standards of the company, the style and format of correspondence, the requirements of certain departments, and so forth, and in addition, some training and practice in the use of the touch system, special instruction in spelling, speed classes and other work for the perfection of their specialty, for the training received in the schools is not expected to be complete. Standards should be sufficiently high that they cannot possibly be reached by workers using motions and methods known to be inferior, no matter how rapidly the motions are made, so that it can be readily understood that it is imperative to learn the best ways.

Clerks being promoted from one position to another will need special instructions on the duties of the new position and details of the work connected with it, which they naturally are not familiar with.

Subexecutives in training for higher positions will also need special instruction. Sometimes this higher instruction is taken in outside educational institutions, such as correspondence schools, night schools, and similar places. In such cases it is important for the company instructor to keep in close touch with the progress of the student and encourage him from time to time when it seems necessary.

Instruction on the Job

Actual instruction on the job is, however, by all means the most important form of training in office work. It implies, not

merely verbal instructions or the learning of sets of rules, but constant, careful, sympathetic training and coaching in the minutiae of the elements of the work, for while each one of these elements is a simple matter in itself, in the aggregate they form the trade or occupation.

Let us suppose, for example, that the job to be learned is the simple one of addressing envelopes on the typewriter. What are the five elements of this work?

1. *Placing the Copy in the Most Advantageous Position.*—If a copyholder is provided, the instructor's duty is to see that it is used in the standard way. There is, as a rule, a tendency on the part of clerks—common also to all other workers—to depart from the standard way; this tendency must be overcome by constant watching and frequent checks.

2. *Laying Out the Work Correctly.*—The layout of the work is equally important. "Any old way" is not permissible. The one best way *must* be used, for unless it is, the best results will not be obtained. The instructor will not merely repeatedly *tell* the worker how to do it, but will demonstrate it manually, *over and over again*, and keep constant watch until the method has become habitual and fixed.

3. *Using the Correct Motions.*—The correct motions for putting an envelope in the machine, for reading and writing copy, for taking the envelope out of the machine and laying it aside constitute a cycle of operations which must be performed in the standard way each time, if the best results are to be obtained. It must not be assumed that the worker can and will do this of his own accord. The habit must be formed.

4. *Learning to Read the Copy the Best Way.*—If this is left to a random choice of method, it will be found that some clerks will write much less rapidly than others; this will be due not to lack of finger speed, but to slowness of mental reaction. The novice will usually look at the copy to read the initials, then type them, next look at the name and type that, then the street address and finally the town and state. These points may be detected by observing the manner in which the typing is done and listening to the tapping of the keys.

The correct way is to read the whole in advance of the typing, and to type steadily until the entire name and address is written. This method—because of the shortness of the time required to

read and commit the name and address to memory—enables the operator using it to write nearly twice as many envelopes with the same typing speed as the person using the incorrect method.

Office operations, as a rule, first require reading, then deciding upon the course to be taken, and finally, taking that course. The decision as to the course to take is not entirely dependent upon actual experience in that particular work, though that is an important factor. More important, perhaps, is the quick reaction of the mind in grasping a situation, which is largely a matter of habit resulting from training and continued, persistent practice.

The habit of speed in mental reaction—which may also be called speed in making a decision—can be cultivated in most persons, if not in all. If the work of the slow-moving clerk is analyzed, it will be found that the chief reason for his slowness lies in this element of decision—it requires an appreciable time for him to decide to make the motion. Some clerks will hesitate before each motion, while others will move rapidly, though quietly, and seem to be exerting no great apparent effort. In typing, this has been alluded to as rhythm—in which lies the secret of speed—but it has not yet been defined in other clerical work.

Watch a slow file clerk sorting letters alphabetically. She picks up the letter, looks at it absently, then realizes that she is not supposed to read it, but to find the name—which she then does; next she turns her glance on the guides in the sorter, looks at them absently, slowly finds the correct one, glances hesitantly at the letter again, and finally puts it in its proper place. The rapid sorter picks up the letter, glances quickly but surely at the place where the name should be, finds it, and at the same moment identifies the proper guide and without the slightest hesitation puts the letter in its place. The actual motions of both will appear to be essentially the same, but one will require twice the length of the time the other does, entirely because of the series of hesitations running through the operation.

5. *Developing the Habit of Speed.*—While the element of decision is the greatest factor in the development of speed, an important additional factor is the development of the *habit* of making quick motions. Assuming that the worker has learned the correct motions and their proper sequence, the next requirement is the

development of speed in making them. This is entirely a matter of habit, which can be acquired only by repeated practice.

This job instruction need not be carried on indefinitely, for there should be a definite goal. Usually this is fixed at two-thirds of the standard rate of production, and when this rate is attained, the intensive instruction may cease, though it is a good practice to continue general supervision—an occasional checking up of the work—still further. The full standard rate will ultimately be attained, the habit of making it become fixed, and the checking up diminished to some extent, though general supervision of course must not be entirely abandoned.

The Cost of the Training

The difference between the average worker in any occupation and the expert is almost entirely a matter of training, yet the difference in their output is enormous, but despite this fact there are many offices which do not have any definite, organized system of training and plead, in extenuation, that it costs too much. The large and successful companies, however, do not look upon the matter in this light, and this is probably one of the many reasons why they are large and successful.

Organized training invariably costs less than the random, hit-or-miss training acquired by the employee in the regular course of the work, and it requires much less time to bring the worker to that highly productive stage which is always evidenced by the manifest efficiency of the organization.

As the worker is paid while he is learning, it appears to some short-sighted managers that they are paying not only the expense of the teaching, but wages to the learner to acquire an efficiency that he may take elsewhere. That, of course, is conceivable as a theory, but it does not work out in practice, for it is noticeable that there is far less desire to shift on the part of trained workers than on that of untrained ones. Experience of labor turnover clearly shows this, and it is not extravagant to state that the reverse is the actual fact; that it is the untrained worker who is most prone to quit and wander from place to place. We have previously referred to the newly employed clerk sitting in bewilderment, untaught and untrained, and finally throwing up the job in despair of ever learning it, and this is by no means a fanciful sketch, but on the contrary, an exceedingly common

occurrence. In short, the thorough training of a working force is the best guarantee for holding it together.

Some offices encourage their workers to take courses in night and correspondence schools, and offer to pay half, or in some cases, even all the tuition fees, upon the completion. These companies evidently have little fear that the student employees will take their efficiency elsewhere.

Individualizing the Teaching

If the instruction given is to be economical, it should be individualized. Experience shows that there should not be more than eight persons receiving intensive training from one teacher at a time. It is evident that where the number of students is small, they can each receive more individual attention, and, as each student is a separate problem in teaching, it follows that the best results are always obtained when this is taken into account.

Selecting the Teacher

Not every person has the capacity for effective teaching, even if he is thoroughly acquainted with the subject, and it is most important for the success of the work of organized training that a person be selected who, besides the requisite knowledge, possesses the capacity for imparting it to others, in the highest possible degree. When analyzed, this capacity is seen to consist of:

1. *Knowledge of the Subject Which Is to Be Taught.*—Without this, even though the lessons are written and thoroughly standardized as to the best methods of teaching, success as a teacher will be small, for the students will soon lose confidence in the teacher and as a result make poor progress. A first-class clerk with several years of experience is a primary requisite.

2. *Patience.*—This is also an essential quality, for the apparent inability of some persons to learn even the simplest things is often entirely due to lack of this quality on the part of the teacher. He should thoroughly recognize the difficulty of learning new habits, and should patiently repeat instructions over and over again, when that seems necessary.

3. *Ability to Express His Meaning Clearly.*—To be able to describe a thing in clear, powerful, and understandable language

is not a capacity possessed by all but is imperative for successful teaching.

4. *Interest in the Work.*—Unless the teacher possesses and manifests a keen interest in the subject which he teaches, his speaking, be it ever so clear and simple, will lose much of its force and effect.

5. *Dependability.*—The instructor should be a reliable person and regular in attendance on his classes; he should set an example in this respect.

The "Flying Squadron"

This term, in office work, is applied to a group of workers trained in several different operations, who may be shifted about from one place to another whenever an emergency arises that needs prompt and efficient handling. The plan of organizing this emergency corps has been in use for a number of years both in office and in factory work.

In office work this idea put in practice has been thoroughly demonstrated to be not only workable, but a valuable factor in reducing peaks and avoiding overtime work.

The clerks forming the squadron are trained in the various office operations in the same manner as the new employees, and the training is continued until they can produce 75 per cent of the standard. As a rule, however, this training requires less time than that expended on new clerks.

Methods for Developing Versatility

While specialization is and properly should be the aim of every office manager in the conduct of his office, a certain amount of versatility is necessary for various reasons.

First, it is by no means certain that the work a clerk is at present engaged on is beyond doubt the best he is fitted for, even if he has an excellent record for quantity and quality of output. It is easily possible that a specialist can do more than one task equally well, and it is at least conceivable that even a clerk who is 100 per cent efficient on one operation may be 100 per cent on another, or even on a third.

Again, on certain important work there is not always a sufficient volume to keep clerks continually busy, and on some tasks regular clerks will occasionally have to help out. It is well,

therefore, to discover the clerks who have a special aptitude for such work and employ them on it.

Finally, in case of peaks in certain sections, it is always valuable to have a number of versatile clerks in other sections who can be switched quickly to cope with the emergency.

If there are standard training methods, such clerks can be taught to perform these special operations. The teaching, of course, will have to be given when this special work is to be done, but it should be as thorough as if it were regular routine work.

If there are no standard training methods, it is important occasionally to shift clerks on routine operations from one special task to another, for the express purpose of developing their versatility. Their performance on these tasks should be specially observed and recorded for future reference.

When this capacity is discovered in a clerk, he or she should be listed as a prospective recruit for the "flying squadron."

Questions for Discussion

1. Why is it unwise for department heads to do their own employing?
2. Why should the functions of employment and discharge be assigned to one person?
3. Comment on the hiring of "experienced clerks," instead of beginners.
4. What is the basis of a job specification?
5. Comment on the waiting room of the employment office.
6. How should the applicant for employment be interviewed?
7. What information should appear on the application blank? Why?
8. Describe in detail the actual procedure of testing an applicant for employment, mentioning any points which should be carefully observed, and giving your reasons.
9. Of how much value are an applicant's references? Why?
10. Comment on the interviewing of applicants for executive positions.
11. What is the qualification card, and what information does it contain?
12. How should the worker be introduced to his job? Why?
13. What is an office manual, and what information should it contain?

14. What is the follow up, and why is it important and necessary?

15. Comment on reasons for quits.

16. How may causes of employee dissatisfaction be determined?

17. Comment on salary standards.

18. What is meant by labor turnover, and why is it important?

19. Describe and criticize the old method of "training" office workers.

20. What should preliminary training include?

21. Comment on training for special work.

22. What is meant by "instruction on the job," and what does it imply?

23. What are the elements of the job of addressing envelopes on the typewriter?

24. Comment on the habit of speed in mental reaction. Do you agree with the statements made?

25. Why are habits emphasized in training?

26. "Job instruction need not be carried on indefinitely, for there should be a definite goal." Explain.

27. To what may be ascribed the difference between the average worker and the expert in any occupation? Do you believe it?

28. Comment on the expense to the employer of training employees.

29. How may the training of employees be individualized?

30. List the special qualifications a teacher should have, and comment on each.

31. What is the "flying squadron," and what is its purpose?

32. How may versatility be developed in clerks?

PROBLEM I

In the home office of the Harrison Company—a chain-store organization—the personnel department is in charge of a man who, before he was employed, had some reputation as a character reader. By a set of ingenious leading questions and a study of the appearance of the applicant, he claims to be able to judge abiiity. Further, each applicant fills out an application form giving his business history, his education, religion, and family background. References given are followed carefully, and, if

any discrepancy in the information given is found, the new employee is immediately discharged. When hired, the applicant is sent to the department where he is to work and immediately assigned a desk. Rules are very strict and many employees are punished in one way or another for infractions. The turnover is about 60 per cent per annum, many either quitting or being discharged in the first month of employment.

What, in your opinion, is the cause of such a high turnover?

Problem II

It is asserted by many executives that, in order to develop initiative, we should not give too minute instructions as to how a piece of work should be done.

Just how far does this apply to office work? Would you permit workers to write their records on plain sheets of memorandum paper? What objection would there be if clerks came in at any hour they pleased, as long as they worked a full 7 hours? Would you permit the file clerk to use whatever system of filing she preferred?

Problem III

In the order-typing division of the office of the Hart Manufacturing Company, there are 18 fanfold billing-machine operators. The machine has a special keyboard, the copy is difficult to handle, and there are many abbreviations to be mastered. The 100 per cent workers write 60 orders an hour, but there are only four such operators, the others ranging from 25 to 75 per cent efficiency. It requires a period of nearly 6 months for an operator to attain 100 per cent efficiency.

What sort of training plan would you install to shorten this period?

XX

COMPENSATION OF OFFICE EMPLOYEES

Every manager has an idea, more or less correct, as to the amount of money he can afford to pay for a particular type of work to which he is about to assign a new employee, but he does not and cannot know how much service that employee will actually render in return for the payment. As a rule the new employee, especially when untrained or only partially trained in the work, does not earn the salary offered, and this fact makes it necessary for the company, in order to recompense itself, to endeavor to place the initial salary at a rate sufficiently low to cover the services rendered and yet sufficiently high to attract applicants and to induce them to accept the work.

This is the problem of establishing an initial salary, and it grows increasingly difficult as the length of tenure increases. In many cases as soon as an office employee is placed on the permanent pay roll, all interest in his welfare—so far as salary is concerned—ceases. The employee, however, never forgets that his salary is small and that he wants more money, and, if he is sufficiently courageous, he will remind the employer of his desires. If, on the other hand, he is timid and diffident, his salary may advance slowly, and not at all in comparison with the increase of his efficiency.

It is frequently found in offices that a number of clerks engaged on identical work receive salaries in which the variations in some cases are very large. Again, in other offices, where there is an annual increase of salary, regardless of whether or not there is a corresponding increase in efficiency, it will inevitably happen that, in the course of time, these clerks will be in receipt of much higher salaries than the company can afford to pay for the type of work being done.

The apparent tendency of the average individual is to rest content with his present progress, inasmuch as he does little or nothing to advance himself. He may "wish" to do so, but the

wish is not usually translated into effort. It is generally, though erroneously, assumed that all persons are ambitious and anxious to advance, when as a matter of fact a large majority of people need constant prodding of some sort to induce them to exert even a moderate effort in their own behalf. This urge may come from within the organization, or from their environment and associates outside of it. On the other hand, there is a large minority of active and restless individuals who are constantly driving to get ahead, some, of course, in a reasonable and sensible manner, and others—far too many—who give little or no such consideration to the manner of their progress, though they are equally tireless in pushing ahead. Sometimes these people succeed, sometimes they fail; but in all cases they make trouble, and they are always in evidence. It is obvious that to cope with these conditions the straight-salary plan is both inadequate and unsatisfactory.

The Problem of Reward for Effort

Work is a natural activity, and the desire to perform it is inherent in all normal, healthy persons though in different degrees, no doubt. But this desire does not include all work, there being innumerable active persons to whom work of some special type is utterly repugnant and distasteful, and in industry there are millions of persons thus misplaced. Millions more are engaged in tasks which, while not actually distasteful, are uninteresting, and at such tasks a person will work at a pace sufficient to relieve ennui, and conversational interludes are welcome.

No work is ever performed without an incentive of some kind, though such incentives actually cover the entire range of human desires. They are both financial and nonfinancial in character, but no normal being "works for nothing" in the sense that no incentive impels him. The nonfinancial incentives in office work may be enumerated as (1) interesting work, manifested by the statement of the employee that he "likes the work"; (2) cheerful, congenial, and healthful surroundings, expressed in the common assertion that "it is a nice place to work"; (3) good treatment—not necessarily the so-called "welfare" work—but such treatment as will call forth the remark that these "are nice people to work for"; (4) a "company spirit," that *esprit de corps* manifested in various social activities of the employees, not

directly connected with their actual work. There are other incentives of this general character, such as the desire to excel or the spirit of emulation. The desire to stand well in the opinion of the group within which one works is also an incentive of this kind, among many others which might be mentioned, did space allow.

Financial incentives, however, are perhaps the most potent, for, after all, they permit the recipient to indulge other desires and interests, all the more eagerly sought because they are of his own unfettered choice, and limited only by the amount of the financial incentive itself.

With all this, however, a high salary is not necessarily an incentive to put forth the best effort. When an increase in salary is first granted, it may seem to have that effect, but this soon wears off, as the recipient gets used to the salary, and the idea grows in his mind that he is worth even more than what he is receiving. This is not to be misconstrued as a recommendation for low salaries, for it is a demonstrated fact that well-paid employees are the cheapest in the long run. Its actual import is that a well-paid employee will not consistently do better work for any length of time if his salary is permanently raised, while the job remains the same.

Profit sharing has not proved itself to be the valuable incentive its originators expected. Its chief defect lies in two prominent facts: First, the profit is not directly related to the effort put forth, for the company may make a large profit for other reasons than the efficiency of its employees, and may even sustain a loss, despite that efficiency; second, even quarterly divisions of profit are too distant from the vision of the employee to constitute a potent incentive.

To be effective, a financial incentive must be directly connected with the effort exerted, and the gain or loss of money involved must be immediately felt.

Again, while financial incentives when properly planned are usually effective in bringing forth extra effort, they are not always so. Thus, if a young person is obliged to turn over his pay envelope to his parents, it is of small interest to him whether it contains a few dollars more or less. For this reason it is recommended that any bonus or premium earned should be paid in a separate payment so that the employee may fully

realize that it is his own spending money. It is even good practice to pay it on a different date from the regular payday.

How Great Should the Reward Be?

The amount of extra pay that will serve as an adequate incentive is a most important though difficult problem for solution, yet a solution must be found. Some managers who have offered small bonuses and failed to get results have concluded that the entire plan is a failure, but such reasoning is clearly defective, as this plan is successfully used in many places. It is obvious that the reward must be sufficient to attract the worker and induce him to put forth his best efforts to secure it, but the difficulty lies in the fact that the company cannot afford to pay more for the increased effort than it is worth. To strike a working balance between these two conditions is a task which requires great power of discrimination and judgment.

In approaching this task, the first principle is that the employee must be paid market rates or pay for ordinary effort. The bonus or premium, to be potent, must be clearly something extra, as a reward for the extra effort, and, if the market rate is not paid for the ordinary work, the employee will not consider the bonus offered as an extra reward.

The second principle requires that the reward should be graded in accordance with the kind of work and the type of worker required to perform it. It need not, and should not, be as great for the common types of work and worker as for the higher grades.

Taylor recommended wage increases as follows:

> For ordinary shop work, such as ordinary kinds of machine operations, requiring no particular mental concentration, close application, skill or hard work, a premium or bonus of 30 per cent of the regular wages; for ordinary day labor, requiring no special mental effort or skill, but calling for strength and bodily exertion producing fatigue, from 50 to 60 per cent; for work requiring skill or considerable mental application, coupled with close application, but without severe bodily exertion, from 70 to 80 per cent; and for work entailing skill, mental concentration, close application, strength and severe bodily exertion, an increase in average wage of from 80 to 100 per cent is necessary to secure maximum production.[1]

[1] Quoted by Dwight V. Merrick, in *Time Studies as a Basis for Rate Setting*, p. 336, McGraw-Hill Book Company, Inc., New York.

For office work, a reward of approximately 50 per cent for extra effort will be found to be effective in producing high results.

The Leffingwell Bonus Plan

This plan is to be used in connection with the work-unit plan described in Chap. XXII.

1. Determine the general average salary paid for this operation.

2. Determine the maximum amount the company is willing to pay for 100 per cent efficiency. In this connection it is well to consider also the minimum amount of bonus which will be an incentive to the employee to reach 100 per cent.

3. As will be seen from the table, the bonus for 100 per cent efficiency is 50 per cent of the standard wage. Therefore, the standard wage plus 50 per cent should equal the maximum sum it is desired to pay for 100 per cent efficiency. That is to say the standard wage should be two-thirds of the maximum, and the bonus for 100 per cent of efficiency, one-third.

Percentage of efficiency	Percentage of bonus	Percentage of efficiency	Percentage of bonus
67	0.0	84	13
68	1.0	85	14
69	1.4	86	15
70	2.0	87	16
71	2.8	88	17
72	3.4	89	18
73	4.4	90	20
74	5.2	91	22
75	6.0	92	24
76	6.6	93	26
77	7.2	94	28
78	8.0	95	30
79	8.8	96	32
80	10.0	97	34
81	10.4	98	36
82	11.2	99	38
83	12.0	100	50

4. Establish a "standard salary" for an operation. By this I mean a sum of money upon which to figure the percentage of bonus. This sum should closely approximate the general run of salaries paid for this operation, but not necessarily so. The only purpose of this standard salary is to figure the bonus, and it does not mean that if a clerk is

getting more than the standard salary or less, he is to be reduced or raised to the standard. The object of having a standard is to make the figuring of the bonus more simple.

5. The sliding scale shown in the table on page 341, runs from 67 to 100 per cent efficiency.[1]

On everything above 100 per cent efficiency, pay a bonus equivalent to the rate per piece at the 50 per cent bonus. For example, if the standard salary is 40 cents an hour, and the standard output is 200 an hour, the bonus for an output of 300 an hour would be figured as follows: 50 per cent of 40 cents is 20 cents, the amount of bonus paid for a production of 200 an hour; since this is at the rate of 10 cents a hundred, a clerk who does 300 an hour will get three times 10 cents, or 30 cents an hour bonus.

A Double Benefit

With this method, the *cost per piece* (figured on the salary plus bonus for a given quantity) is progressively reduced as the quantity done increases, and the clerk gets an adequate reward for increasing his output. In the example given above, suppose that the average output before standardization was 100 an hour. At 40 cents an hour (the minimum rate allowed by the Fair Labor Standards Act of 1938), the cost per piece would be $0.004. Suppose that standardization eliminated waste motion and improved the method so that a standard output of 200 an hour would be reasonable. The clerk's salary and bonus at 200 an hour would total 60 cents an hour; but the cost per piece has fallen from $0.004 to $0.003; if the clerk should reach 300 an hour and thereby receive salary and bonus totaling 70 cents an hour, the cost per piece would have dropped to $0.0023.

Looking at it another way, the output for a 40-hour week at 100 an hour would be 4,000 pieces, costing $16 (at 40 cents an hour). An output of 8,000 costs only $24 (at 60 cents an hour), while an output of 12,000 costs but $28 (at 70 cents an hour). Before standardization, the total average output of three clerks was just equal to the output of one clerk after standardization, with the incentive of a bonus. In addition there is a real saving in overhead. It should be borne in mind that if the standard is

[1] Leffingwell, W. H., *Scientific Office Management*, p. 250, McGraw-Hill Book Company, Inc., New York (Now out of print).

properly set, there is little likelihood of a clerk's reaching 150 per cent of the standard; but it may be possible in many cases. Hence the necessity of extreme care in setting standards.

Where a clerk works on both standardized and unstandardized operations, pay the bonus for the actual time worked on standardized operations, and the regular wage or salary for the balance of time spent on unstandardized ones.

Applying the Bonus

The bonus should not be figured on the amount produced each day, but upon the total hours worked on standardized work during the pay period. This is an incentive to keep the standard of efficiency both high and equable instead of spurting one day and lagging the next.

Whatever plan may be used for rewarding workers for first-class work, the following requirements should be considered:

First, the standard should be scientifically set, and thus constitute what a first-class worker can do in a specified time, by using the one best way. Guesswork, or setting the standard by past performances, will lead to trouble.

Second, the task should be set sufficiently high so that a full day's work may be secured from a first-class worker. If conditions make it advisable to make a temporary allowance for new workers (though the graduated-bonus plan generally takes care of this satisfactorily), it may be done, but it should be distinctly understood that such allowance is made and the standard, as set, is still to be considered as an attainable goal.

Third, there should be rigid inspection of the completed task, and the worker should be penalized for defective work. The penalty should consist of a deduction from the bonus, for it is not a wise plan to deduct from the salary. If necessary, these deductions may be made to the extent of taking away the entire bonus if the work is done hastily or carelessly, but it is never a good practice to make a further deduction by taking away part of the regular salary. On the other hand, such deductions should not be unreasonable, for it should always be remembered that the purpose of the bonus is to encourage the worker to increased production, and he should not be discouraged by making the penalties too severe.

Fourth, the standard, if scientifically set, will remain correct until the method is changed. It should not be changed if an exceptional worker makes more than the company thinks he should, for this condition is a decided stimulus to the others. On the other hand, if the standardizer makes an error and sets the standard too low, the company should stand by the engagement and give the employees the benefit of the excess rate, for cutting rates will inevitably bring trouble that will cost more than the excess rate.

Rewarding the Section Head

In a section where there are a number of workers receiving a bonus on standardized operations, there should be some plan for rewarding the section head if bonus is earned, for he, too, needs an incentive to encourage him in pushing on the work. One plan that may be used is to pay the section head a bonus of, say, 10 cents for every employee who earns, say, 50 cents a day in bonus. The result of this is to give the section head a financial incentive in seeing that each and every worker earns a bonus, which is, of course, the end desired.

Salary Standardization

Although nearly every office manager will readily admit that a wage-incentive plan of some kind would be a fine thing to have and that he hopes to have such a plan in operation some day, there are many companies which are not paying on a measured work-production basis, even though it may easily be shown that the returns would be many times greater than the initial investment of time and money.[1]

Another plan for compensating office employees on a fair basis, known as salary standardization, is not based upon a measured output and bonuses, but upon a careful classification and standardization of office positions and the allocation of graded salaries to each position. The objective is "equal pay for equal work"; that is, every job in the office which has the same qualifications and carries the same duties and responsibilities should carry the same salary. Unless some such plan is in effect, there will be found differences amounting in some cases to as much as 50 or 100 per cent. Certainly, if two persons are doing the same

[1] See *NOMA Forum*, Vol. XVI, No. 2, pp. 22–28.

quality and quantity of the same kind of work, one of them is not worth twice as much as the other.

To get the full benefits from a salary-standardization plan, the entire office should be analyzed and standardized as described in Chaps. XVII and XXI to XXIII. In any case, position analysis and classification are necessary before even a start can be made.

The data resulting from analyzing all the work done in the office will show the nature of the work done by each individual and will make it possible to set up certain reasonably well-defined classes of positions, which will include all or nearly all the office employees. Special classes may be indicated to take care of special cases, but these should be kept to a minimum and should not be set up unless they cannot be included in the standard classifications. The types of office workers described in Chap. XVII may be used; or those used by the National Office Management Association in its salary surveys,[1] as follows:

I. Stenographer, Sr.....	Takes varied and rapid dictation of any degree of difficulty and transcribes from shorthand notes.
II. Stenographer, Jr.....	Takes routine dictation or that of simpler nature or in limited fields and transcribes from shorthand notes.
III. Transcriber, Sr.....	Transcribes from wax cylinders varied dictation of any degree of difficulty.
IV. Transcriber, Jr.....	Transcribes from wax cylinders dictation of simpler or routine nature or in limited fields.
V. Typist, Sr.....	Types rapidly and accurately varied material of any degree of difficulty including typing from rough drafts, tabular and statistical material, stencil cutting, etc.
VI. Typist, Jr.....	Types simpler material of limited variety such as straight typing from printed or clean copy, form typing, nonstatistical reports, etc.
VII. Messenger.....	Runs errands. Collects and distributes mail. Opens and puts up mail. May operate duplicating machines.
VIII. File Clerk, Sr.....	Classifies, indexes, records and files correspondence, cards or other documents of any nature. Charges out material. Maintains tickler files. Searching and transfer of files.

[1] *Report of the National Salary Survey*, National Office Management Association, Philadelphia, 1940–1941, p. 8.

IX. File Clerk, Jr.....	Sorts, arranges and files cards or papers by alphabetic, numeric, or date classifications after having been classified and indexed. Withdraws and refiles filed material. Performs routine clerical work related to files.
X. Receptionist.....	Greets and directs visitors. Requires tact, good personality and thorough knowledge of company organization. May perform simple clerical duties.
XI. Telephone Operator..	Operates switchboard or PBX and keeps records pertinent to telephone service.
XII. Telephone Operator-Receptionist.	Operates switchboard or PBX and greets and directs visitors. May perform simple clerical duties.
XIII. Bookkeeping Machine Operator.	Operates bookkeeping machine or typewriter with calculating attachments in connection with accounts payable or receivable, cash receipts and disbursements, etc., from miscellaneous or prepared medium. May include ledger stuffing or other incidental clerical duties.
XIV. Billing Machine Operator.	Operates billing machine, types invoices and bills from original orders or shipping papers. May include some checking of calculations and other data.
XV. Calculating Machine Operator.	Computes or verifies by machine all types of calculations involving addition, subtraction, multiplication, and division. May involve some tabulating or related clerical activities.
XVI. Key Punch Operator.	Punches and verifies tabulating cards. May involve some coding.
XVII. Tabulating Machine Operator.....	Operates machine tabulators and sorters.

It will be noticed that the incumbents of many positions may be called juniors and seniors. Sometimes an intermediate classification may be used, as in that of the Boston Chamber of Commerce, which lists three classes of stenographers, designating them as Stenographer, Grade I, Stenographer, Grade II, and Stenographer, Grade III.

Describing the Duties Performed

Accompanying the standard position title for each class of position is a description of the duties performed in that position.

This description may be simple and brief, as in the NOMA list; or it may be more detailed, like that of the Boston Chamber for Stenographer, Grade II, for instance:

Stenographer, Grade II.—A clerk with ability to perform ordinary stenographic work requiring ability to make and transcribe notes, a limited knowledge of the company's business routine, and ability to type with speed and accuracy.

The description of the duties of a stenographer in the classification of the Westinghouse Electric and Manufacturing Company is also simple and easy to comprehend:

Take and transcribe shorthand dictation.
Keep records and cast these into periodic or occasional reports.
File letters or mark for file.
Cut stencils.
Prepare copy for photostatic reproduction.

The description of the duties of a stenographer in the United States Employment Service *Dictionary of Occupational Titles* is as follows:

Take dictation in shorthand of correspondence, reports, and other matter, and transcribe dictated material, writing it out in longhand or using a typewriter. May be required to be versed in the technical language and terms used in a particular profession. May perform a variety of related clerical duties. May take dictation on the stenotype.

The description of the duties of a senior stenographer by the joint committee of the United States Congress is more specific and detailed:

To take simple, ordinary dictation, by a symbolical or mechanical process, at a speed of not less than 110 net words per minute; to transcribe such a record on a typewriter at not less than 40 net words per minute; to typewrite at not less than 55 net words per minute from plain manuscript, printed or typewritten matter, or from dictation; occasionally, to transcribe on a typewriter from a dictating machine; to act in a secretarial capacity when required; to cut stencils; to prepare routine and minor correspondence; and to perform related work as required.

The description of the duties of a senior stenographer by the *Personnel Classification Board* of the United States Civil Service Commission is:

Under immediate or general supervision, to perform stenographic work of more than average difficulty, such as taking at a rapid rate of speed in shorthand and transcribing dictation with considerable variation in subject matter, in which technical and unusual words, expressions, and phrases occur frequently; occasionally preparing correspondence in cases which require the exercise of independent judgment and familiarity with the work of the organization; or assisting in the supervision of a section of stenographers and typists.

The description of the duties of a Grade II stenographer by the United States Railroad Labor Board is:

The preponderant duties of incumbents are to take and transcribe dictation; to perform difficult typewriting work requiring considerable ability in the use of a typewriter; and may involve, in addition, the performance of clerical work of a routine nature, requiring a knowledge of the branch of service to which assigned, or experience in the routine of the department or subdepartment in which engaged; and to perform related work.

An examination of these specimen descriptions of the duties of a stenographer will show the possibilities of variation. The analysis of the actual duties performed by the stenographers in any one office will probably reveal even more variations from those shown above. Since one valuable by-product of the analysis will be to show just what each office worker is really doing, subsequent standardization will usually make it possible to simplify and standardize the duties so that eventually all employees bearing the same job title will have substantially the same duties.

It will help to bring about this desirable result if clearly understood terms are used in describing the duties. Riegel urges that ambiguous terms like "assist," "handle," "prepare," "supervise," and "review" be avoided, and offers the following terms as helpful:[1]

Verbs which Pertain to Information and Records.—Keep, copy, post, secure, compile, allocate, originate, review, analyze, design, distribute, file, calculate, credit, debit.

Verbs which Pertain to Equipment, Supplies, and Product.—Operate, procure, construct, store, maintain, transfer, design, plan, distribute, inspect, deliver, route, ship.

[1] Riegel, John W., *Salary Determination*, p. 86, Bureau of Industrial Relations of the University of Michigan, Ann Arbor, 1940.

Methods.—Devise, select, develop, install.

Personnel.—Delegate duties, appoint, instruct, supervise, direct, judge, recommend, pay, discipline, reorganize.

Customer Relations.—Inform, interview, telephone, write, visit, sell, advertise, negotiate, appraise, adjust.

Money and Valuables.—Secure, deliver, store, guard, invest, speculate, collect, receive, pay, control.

In making the analyses of positions and in writing the descriptions, enough time should be allowed to do a good job, since the foundation for the plan of salary standardization is being established; if the foundation is weak, the superstructure will not endure. The detailed occupational description in Chap. XVII will bear considerable study as a model.

Many analysts use rating charts. One value in using a chart is that it reduces the likelihood of any features being overlooked and places all the analysis work on a uniform basis. A chart also helps to provide the information necessary to evaluate the position. The General Foods Job Rating Scale illustrates the features of such a chart.

Determining Salaries for Each Position

With the position classification, the job description, and the relative evaluation of each position ready, the next step is to determine the salaries to be paid in each position.

A number of considerations present themselves in determining what salaries are to be paid. Practically all these considerations are concerned with the relativity of the salaries finally established. Some of the considerations are external and some are internal.

For example, whatever salary figure is established for a certain position, it should not be out of line with the salaries paid by other offices in the same locality for the same position. It should never be lower than the local "market," and it should not be so far above as to be a conspicuous exception.

Again, with respect to any given position, a reasonable question to ask is whether or not the salary paid to a beginner should be lower than that paid to a thoroughly experienced and competent worker. The answer is affected by whether or not experience in the particular job increases the value of the incumbent to the company, on the same job. On some jobs, quickly learned and mastered, experience does not increase the proficiency and value

GENERAL FOODS JOB RATING SCALE

Unit and Location _____ Title of Job _____

FOR JOBS VALUED UNDER $4,000. PER YEAR

Date _____ Rated by _____

FACTORS	Rate the job on the basis of 100% performance. Mark in column at extreme right the rating value which represents degree to which factor applies to this job.* Use odd number ratings as 1, 3, 5, 7 and 9 to express intermediate degrees of value.						NUMERICAL RATING
	0	2	4	6	8	10	
Education—this is the formal preparation required to perform the job. Need not be obtained in school but assume school standards in this rating.	*Grammar School* OFFICE jobs—seldom applicable. FACTORY jobs—ordinary labor or equivalent.	*2 Years High School* OFFICE jobs—about min. FACTORY jobs—leader of small gang; simple figuring; semi-trades.	*High School Graduate* OFFICE jobs—ordinary clerical, typing, etc. FACTORY jobs—better clerical, supervisory and trades.	*H.S. plus Bus. or Voc. School* OFFICE—better cler., bkkpg. or secty'l. FACTORY jobs—dept. heads and foremen.	*College Graduate* OFFICE or FACTORY jobs—major superv., some advanced office, chemistry, engineering.	*College Grad. plus Technical* OFFICE or FACTORY jobs—Reserve for places where grad. tech. or spec. preparation is necessary.	
Previous Experience in same or related work. This is the practical preparation required and includes essential experience in preceding jobs.	*None* OFFICE jobs—possibly messenger. FACTORY jobs—strictly common labor.	*1 Year* OFFICE jobs—minor clerical or equivalent. FACTORY jobs—important labor.	*2 Years* OFFICE jobs—for avge. cler., steno. or equiv. FACTORY jobs—many proc. & machine tending.	*3 Years* OFFICE jobs—for better cler. steno. or equiv. FACTORY jobs—some trades; min. for leader.	*4 Years* OFFICE jobs—substan. back ground & knowledge. FACTORY jobs—trades and typical foremen.	*5 Years or More* OFFICE or FACTORY jobs—Reserve for important supervisory or technical jobs.	
Training Time on job. Time to comprehend all aspects of job. Include time for understudying any other job which is part of duties.	*Very Little*	*1 Month*	*3 Months*	*6 Months*	*12 Months*	*18 Months or More*	
† *Physical or Mental* fatigue in job due to requirements or to working conditions. This is the "wear and tear" resulting from the work.	*Very Light* For simplest exercise of mind or body; some easy routine job.	*Moderate* Where occupant is seldom extended; many ordinary routine jobs.	*Average* For normal activity at usual types of work under good working conditions.	*Active* For busy jobs that keep occupant "on his toes" most of time—somewhat above average.	*Strenuous* For unusually busy or exacting jobs where endurance is taxed frequently.	*Extreme* Reserve for the most severe jobs.	
Details to organize and handle outside of routine or explicit instructions. Weigh "importance" and "frequency."	*Very Few* Simplest labor jobs or equivalent take this rating.	*Recognized Factor* For jobs that are well routinized or directed but have some details.	*Substantial Number* About right for job on varied work—typical clerk or leader of small gang.	*Important* For jobs where details outside the control of routine superv. merit extra consideration.	*Very Important* For jobs where details constitute a big problem—should be important details.	*Extreme* Reserve for important jobs with a mass of details that cannot be routinized.	

FACTORS	Rate the job on the basis of 100% performance. Mark in column at extreme right the rating value which represents degree to which factor applies to this job.* Use odd number ratings as 1, 3, 5, 7 and 9 to express intermediate degrees of value.						NUMERICAL RATING
	0	2	4	6	8	10	
Quality requirements—extent job demands care and skill. Weigh "care," "skill," "accuracy" and "frequency of application."	*Minor Consideration* For all low-grade jobs where there is little need or opportunity for care or skill.	*Recognized Factor* For jobs where quality is of enough importance to become a factor.	*Ordinary* OFFICE jobs—about right for the avge. FACTORY jobs—many proc. and mach. tending.	*Important* Office and factory jobs requiring special care and precision.	*Very Important* For jobs which require undivided attention and where failure would be a serious matter.	*Exceptional* Reserve for the most exacting jobs—great concentration plus high skill.	
Resourcefulness—extent to which initiative and ingenuity are required on problems outside the control of routine or supervision. Weigh "importance" and "frequency."	*Very Little* For jobs where little or no resourcefulness is required.	*Occasional* For jobs particularly well routinized or directed.	*Frequent* For jobs requiring independent thinking and action possibly once a week.	*Daily Problems* For jobs requiring independent thinking and action almost daily.	*Great Deal of Independent Thinking*—About right for many of the high-grade supervisory jobs.	*New Problems Constantly* Reserve for jobs where it is necessary to face and decide important matters constantly.	
Versatility—number of major skills or operations required. Weigh number and quality of talents, recognising that some might rate more and others less than 1 credit.	1 *Credit* (Explain)	2 *Credits* (Explain)	3 *Credits* (Explain)	4 *Credits* (Explain)	5 *Credits* (Explain)	6 *Credits or More* (Explain)	
Cooperation and Personality—need for tact and agreeableness in working with others. Allow for outside contacts.	*Very Little* For a job where occupant works alone and contacts are unimportant.	*Below Average* For ordinary rank and file jobs where occupants merely work together in groups.	*Average* For all jobs where occupant must contact others to some extent as well as the boss.	*Above Average* For important contacting jobs where factor should get some extra recognition.	*Very Important* For major contacting positions with customers or personnel.	*Exceptional* Reserve for jobs where personality and ability to cooperate are primary qualifications.	
Responsibility—relation of job to company assets and success of business. Base on reasonable assumptions and include both tangible and intangible effect on product, equipment, and goodwill. Consider checks and supervision.	*No Direct Relation* For jobs that involve practically no loss or gain to the Company.	*Very Little Relation* For jobs where effect of gain or loss is estimated not to exceed $1,000. or its equivalent.	*Moderate* For jobs where effect of gain or loss is estimated not to exceed $3,000. or its equivalent.	*Important* For jobs where effect of gain or loss is estimated not to exceed $10,000. or its equivalent.	*Very Important* For jobs where effect of gain or loss is estimated not to exceed $25,000. or its equivalent.	*Directly Affects Success of Business* Reserve for jobs where effect of gain or loss is estimated to reach $50,000. or its equiv.	
						TOTAL RATING FOR THIS JOB	

* For purposes of general uniformity follow the explanations on this rating sheet as closely as possible but do not interpret narrowly.
† For factory jobs base on Light, Light Medium, Medium, Medium Heavy or Heavy work as explained in the Standard Practice Instructions.

FIG. 18.

beyond a certain point. In other jobs, especially those where such elements as judgment, responsibility, and executive ability are concerned, experience may increase the value of the individual in the given position.

Upper and Lower Salary Limits

At all events, it is obvious that there should be a minimum salary for each position. This minimum is not concerned with the legal minimum for all positions established by wage-and-hour legislation; but rather is intrinsic in the job. And there is a maximum figure which represents the highest salary that any individual could reasonably expect to receive in a particular position, regardless of how proficient he might be in the work of that position—as long as he stays in that position, his top salary is the maximum for that position. (This does not affect the question of bonuses or extra payments for especially good work, or to counter increases in the cost of living, or for the payment of additional compensation where the payment is on a measured production basis.)

In other words, there is a maximum and a minimum salary for each position classification. An employee in that position will never receive less salary than the established minimum or more than the established maximum for that classification. When his position is changed, his compensation will be determined by the established limits of the new job.

In addition to the established minimum and maximum rates set for each position, there usually will be intermediate rates as well. If, for example, the minimum salary for a certain position is $16 a week, and the maximum $20 (or 40 cents an hour and 50 cents for a 40-hour week), there may be one intermediate salary of $18, or there may be three of $17, $18, and $19. (Reckoned on an hourly basis, there are nine possible intermediate points between 40 cents an hour and 50 cents.) Just how many intermediate points should be provided will depend largely upon how long it should take a beginner at the minimum rate to increase his worth to the company to justify the maximum rate. Also, the frequency of salary adjustment may be a factor. If salaries are adjusted twice yearly, the need of more intermediate rates is evident; if salaries are adjusted annually, fewer intermediate rates are called for.

Suppose, for example, that in the above position it was determined that it would take 2 years for a beginner to reach the maximum. Starting at $16, the salary would be increased to $18 on the first anniversary of employment, and to $20 on the second, provided the services rendered were satisfactory. If salary adjustments were made semi-annually, the first increase would be to $17 in 6 months from the date of employment, to $18 in 1 year, to $19 in another 6 months, and finally to $20 at the end of 2 years. If a concern's policy is to consider each new employee as temporary for a stated period, such as 3 months, for example, the first increase could be made effective, if desired, at the time the employment becomes permanent.

What Is a Fair Starting Salary?

The fact that a certain position has a minimum salary does not mean that every employee who enters that position will receive the minimum at the start. A beginner would, but a beginner is one who meets the minimum qualifications.

Again, an employee in a stated position does not have to remain in it until he receives the maximum salary for the position before he can be promoted to a higher one. The limits are for the position, and when an employee is transferred or promoted to another position, his salary is immediately subject to the limits of the new position.

The salary limits for each position usually overlap those of the one next above and below. If, for instance, the limits for three positions in line are $16–$20, $18–$22, and $20–$25, it is obvious that an employee receiving the maximum in the lowest position may actually be getting more than a beginner in the next higher one. This does not mean that when an individual receiving the maximum for his present classification is promoted to the next higher one, he will receive only the minimum for that higher position. Not at all; there would be no object or advantage to anyone in such an arrangement. He will either receive the same salary that he has been getting or will be paid the next higher rate in the new position, depending on the circumstances. He would never receive less; and it is always a question as to whether a promotion is really a promotion unless it is accompanied by an increase in pay.

Advantages of Salary Standardization

With a salary-standardization plan carefully worked out and in operation, the following advantages may be expected:

1. Every individual knows that he is being paid as much as every other individual in the same position. This knowledge removes one very great source of discontent.
2. Every individual knows that he is receiving as much as or more than he would get for the same work elsewhere in the same community. This removes another source of uneasiness.
3. Every individual knows that his progress in his position and in the company depends on his own efforts; he knows what he may expect in his present position, and he knows what he must do to qualify for a higher paid position. This knowledge acts as a spur to ambition and a stimulus to sustained effort.
4. All secrecy with regard to salaries is done away with. The company and its employees know what to expect of each other, and what is expected, and can concentrate on the main business in hand—giving customers the very best service possible.

Questions for Discussion

1. What is the problem involved in establishing beginning salaries?
2. Is this problem confined to initial salaries? Explain.
3. Why is the straight-salary plan of employee compensation both inadequate and unsatisfactory?
4. "No work is ever performed without an incentive of some kind." Do you agree? Explain.
5. Are incentive-wage methods valuable in the office? Why or why not?
6. Comment on nonfinancial incentives in office work, illustrating your answer.
7. Why are financial incentives more potent than nonfinancial ones?
8. "A high salary is not necessarily an incentive to put forth the best effort." Why not?
9. Are financial incentives always effective in bringing forth extra effort?
10. What are two defects of profit sharing as an incentive?
11. State and explain two principles underlying the problem of determining the amount of extra pay that will serve as an adequate incentive.

12. What were Frederick W. Taylor's recommendations as to wage increases?

13. What reward is recommended for extra effort by office workers?

14. Describe the Leffingwell bonus plan in detail and illustrate your answer. Do you think this is a fair plan? Why or why not?

15. On what basis should a clerk who works on both standardized and unstandardized operations be paid?

16. "The bonus should not be figured on the amount produced each day." Explain and comment.

17. State four requirements to be considered in rewarding workers for first-class work, and comment on each.

18. Should the standard output be set at the level of the average worker? Why or why not?

19. If not, how should the standard be set, and how high should it be?

20. Is rigid inspection necessary? If so, why? If not, why not?

21. Comment on the imposition of penalties for defective work.

22. How long should the standard remain after it has been scientifically set? Why?

23. How may the section head be rewarded if his group earns a bonus? Is this reasonable? Why or why not?

24. What is the objective of a salary-standardization plan? Do you believe that is a fair objective?

25. Upon what is a salary-standardization plan based?

26. What two steps are necessary before a start can be made on a salary-standardization plan?

27. Why should all jobs in the office be grouped in classes, so far as possible?

28. Which of the several occupational descriptions of the position of stenographer do you prefer? Why? Do you think you could write one better than any of those given in the text?

29. "Eventually all employees bearing the same job title will have substantially the same duties." How can this be brought about?

30. Why do you think Professor Riegel urged that certain terms be used and that certain other terms be not used in occupational descriptions? Do you agree?

31. How much time should be allowed to analyze the office positions and write the occupational descriptions of them? Why?

32. What is the value of using a rating chart like that of General Foods, for example?

33. What factors should be considered in determining the salaries to be paid?

34. Comment on the maximum and minimum salaries for each position.

35. What is the value of intermediate rates?

36. Will every employee who enters a position receive the minimum for that position at the start? Explain.

37. Does an employee have to remain in a position until he receives the maximum salary for it before he can be promoted to a higher position? Explain.

38. What advantages may reasonably be expected from the operation of a carefully worked out plan of salary standardization?

Problem

The Popular Priced Stores, Inc., is a chain-store organization. In its home office, where 500 clerks are employed, it is proposed to use incentive wage-payment methods. However, there are many operations which are not repetitive in the ordinary sense of the word, though naturally each situation is not entirely a new circumstance but repeats itself at irregular intervals. There are other jobs which are, with some difficulty, measurable but which are handled by very small groups of office workers, sometimes but one or two in a group. Just how far should this company go in installing bonus plans and, if completely, what is to be done in the two instances mentioned above?

XXI

SCIENTIFIC ANALYSIS

As set forth in Chap. II, the first principle of office management is stating the problem, that is, defining the work to be done and stating its purpose. The second principle is analyzing the problem, so that we may be sure that we understand what the problem actually is—not what it seems to be. Scientific analysis, as the term is applied in scientific management, signifies a most careful consideration of a business problem, by following a definite mode of procedure. Its requirements are as follows:

1. *A definite objective.*

2. *The analysis of the problem through a careful study of the purpose or objective.* In actual practice, this second requirement is inseparable from the first.

3. *A series of exhaustive observations or experiments* and a careful collection of data, all, of course, having a practical bearing upon the objective and directly connected with it.

4. *A clear, complete, and thoroughly accurate record of all the experiments and observations* made and a record of the progress of the investigation, not in mere memorandum form, but written and classified in such manner as to be understandable by others, so that anyone may see the discovered facts in their true relationship.

5. *A thorough and exhaustive study of the facts* thus collected. Their mere collection is not sufficient for the solution of the problem, for in most cases the solution is by no means immediately obvious. It frequently happens also that the collector of the facts is not their interpreter; but whether or not this is so, it is certain that the facts gathered must be studied and interpreted by someone.

6. *A permanent record of the results* of this interpretation of the facts, put in such shape that the knowledge thus gained may be used immediately or at any future time.

The Three Major Steps

The first three steps of scientific analysis, which we shall now discuss in more detail, may be called scientific thinking. This

scientific method of thought is an orderly logical mental process, which must be assiduously cultivated and is acquired only through much practice and experience; in other words, it is *trained thinking.*

1. *The Formal Definition of the Objective.*—The first of these steps or principles is that there must be a definite purpose, a definite objective.

It is very important that some method be devised to make it obligatory to define in writing the purpose of each investigation. One such way is to give each problem an assignment or case number. Then an assignment or case book can be kept, in which each assignment is given in numerical order, and its description can take the form of a complete statement of the purpose of the investigation. This record can then be cross indexed by subject for future use. If the objective is fully defined on the record of the problem itself, it may be briefed in the assignment record, but it should be written out completely somewhere.

2. *The analysis of the problem* outlined in the definite statement of the objective is work which must be performed with great care and accuracy. Each problem is divisible into many factors, and in this division it is especially necessary to guard against the intrusion of extraneous matter not covered in the definition of the purpose.

The analysis of the problem should begin by obtaining all the knowledge at present available on the subject, and for this purpose the best books procurable should be examined. If there are in the office any previous records of similar work, these should also be studied. Experts should be consulted, and by expert is meant some person experienced in handling the particular problem to be solved. It will often be found that employees in inconspicuous positions are in reality experts on some particular subjects. Occasionally, experts outside the office must be consulted, and these experts usually pay their way. At times much valuable information can be procured from the representatives of the manufacturers of the office devices and equipment, but such information, it should be remembered, is usually biased and therefore needs careful weighing and consideration. But no available source of information should be neglected. All this preliminary work should be done, so that time will not be wasted

in solving problems that are already solved, just as most inventions are afterward reinvented many times. But while it is advisable always to ascertain all that has been done before on any business problem, care must be taken that this does not lead the investigator into the insidious habit of imitating what others have done, for mere imitation will not raise the standard of office management. Nevertheless, a study of what others have done will be of material aid in the solution of any problem, even if we only learn what to avoid.

It will greatly simplify the work of analysis of problems if the investigator will, from time to time, frame skeleton outlines of the main factors. When thought is once applied to the subject, and thus recorded in skeleton form, repetitive mental labor can be saved by using the original outline again and again when considering equipment problems.

3. *The Making of Observations.*—The collection and interpretation of the related facts in the case involves the gathering of statistical and other data, the making of observations and experiments, work which must be complete, accurate, and exhaustive, and which includes also the interpretation of these facts and the permanent use of such of them as are found valuable in the formation of standards to be established.

If the analysis has been carefully made, it will show very clearly just what facts are to be observed, and in this process it is important that the observer should confine his attention to these facts only and observe them one at a time, a procedure which is a cardinal rule in all scientific observations. It is not possible to observe several factors simultaneously, and all scientific investigators, in any field, deliberately limit their observation so that they may fix their attention upon one thing at a time—and this rule is as imperative for investigations in the office as it is in the laboratory.

It is, however, equally impossible for a trained observer of waste and inefficiency, to overlook, altogether, glaring defects which actually thrust themselves upon his notice, while he is observing some particular factor or condition. These facts, while not directly germane to the subject in hand, are nevertheless valuable—too valuable to ignore or forget. It is good practice, in such cases, to stop the investigation long enough to record such facts, then dismiss them for the time being, and resume the

investigation. At the end of the day, these casual observations are recorded separately and filed as miscellaneous matter relating to the problem in general. In this form they constitute valuable leads to future work and in some cases may be found to have a bearing upon the problem being studied. It will be helpful to make outlines for the conduct of observational work.

The Making of Scientific Experiments

There is very little literature available which deals with the fundamental principles underlying the subject of scientific experimentation, and next to nothing on what constitutes a scientific experiment and the conditions governing its conduct. Even among the books and articles of scientists, little or nothing of the kind will be found—which is possibly an oversight. The office manager, therefore, who may not have had a scientific education will be at a loss to know how to proceed.

The result of this condition is that, on the one hand, while the subject itself is enveloped in comparative obscurity and is in a sense mysterious to the layman, on the other, much work that is heralded as scientific experimentation and accepted as such by the multitude would be scouted by the merest tyro acquainted with the fundamental principles involved in such work.

The chief difference between an ordinary experiment and a scientifically conducted one is that the latter is made under controlled conditions, and the results carefully recorded, while the former is not.

Scientific experimentation is popularly conceived of as connected with the term "laboratory," but that word, like its companions, "studio" and "atelier," is not usually conceived of as a workshop. Yet these three terms connote nothing more than a place where a certain kind of work is done, and the term "workshop" is applicable to all three.

Perhaps the classic example of the application of science to business is the extended experiment of Frederick Winslow Taylor to determine the laws underlying the cutting of metals. The genesis of the inquiry was Taylor's search to discover just what was a day's work for a machinist, and he soon perceived that the difficulty in the way of its solution was the inability of anyone to say definitely and scientifically what could be expected of the machine under proper conditions. This difficulty had indeed

been recognized before by other people, but Taylor set himself to solve it. He admits that he had no idea that the task would be as large as it ultimately proved to be, but nevertheless he began and conducted it rigidly along scientific principles of experimentation. One paragraph from his detailed description of the scope of the work may be quoted here, not only as showing the magnitude of the task, but the patience and minuteness with which it was wrought out. Mr. Taylor, after stating that the experiments covered a period of 26 years, adds the following:

> The thoroughness with which the work has been done may perhaps be better appreciated when it is understood that we have made between 30,000 and 50,000 recorded experiments, and many others of which no record was kept. In studying these laws we have cut into chips with our experimental tools more than 800,000 pounds of steel and iron. More than 16,000 experiments were recorded in the Bethlehem Steel Company. We estimate that up to date between $150,000 and $200,000 has been spent upon this work, and it is a very great satisfaction to feel that those whose generosity has enabled us to carry on the experiments have received ample return for their money through the increased output and the economy in running their shops which have resulted from our experiments.[1]

But in a far larger sense the patience and thoroughness of this indefatigable scientist—for a scientist Taylor was in the very highest sense of the word—has been rewarded. The Bethlehem Company was not alone in enjoying the results of this scientific experiment, for, to quote Mr. Henry R. Towne, himself one of the foremost of America's industrial scientists, Taylor "has literally forged a new tool for the metal trades, which has doubled or nearly trebled the productive capacity of nearly all metal-cutting machines."[2]

That cynical philosopher of over 200 years ago, Swift, has one of his characters observe that he considered the greatest benefactor of his kind to be the man who made two blades of grass grow where but one had been known to grow before. Taylor has even more than qualified as a member this category.

[1] TAYLOR, FREDERICK WINSLOW, On the Art of Cutting Metals, *Transactions of the American Society of Mechanical Engineers*, Vol. 28, pp. 7–8.

[2] Quoted by Frank B. Copley in his *Frederick W. Taylor, Father of Scientific Management*, as an introduction to the author's foreword, 2 vols., published by the Taylor Society, New York, 1923.

There are probably no opportunities of such tremendous scope awaiting the scientific experimenter in office management, but there are innumerable places in that activity where scientific experimentation has never been attempted and where it would amply repay the effort expended.

Even where the subject studied does not involve any extended investigation, it is much better to employ the scientific method than to experiment in a haphazard yet costly manner, only to discover that the results are worthless.

Definition of A Scientific Experiment

A scientific experiment may be defined as an observation or group of observations of a certain particular fact, made for a definite purpose, and under conditions which are controlled in such a manner as to permit the experimenter to observe the fact, unaffected by any variable factor or factors.

It naturally follows, then, that, if we propose to observe a particular fact, we must know with just what phase of that fact we are concerned. This implies our definition, or as it is sometimes called, the hypothesis. Also, if we are to separate the particular thing we wish to see and know from the things we are not concerned with, we must analyze the problem in order to discover all the factors and determine on ways and means to control them, if they interfere with our observation. Finally we must make and record the observations. This recording must be done at the time the observations are made, because it has been found that the records often contain elements which, if known exactly, are of great value in the solution of the problem, and we cannot afford in these matters to trust our memory. So we thus perceive that a scientific investigation is a controlled and recorded investigation as to the truth or falsity of a hypothesis.

Limiting the Purpose of the Test

After one has made a few preliminary attempts at scientific experimentation, he will soon discover that it is imperative to limit strictly the purpose of the test. Let us suppose, for example, that it is desired to test carbon paper. What do we want to know about it? One could almost exhaust the entire accumulated knowledge of science before one would know *all* there is to know about carbon paper. Do we wish to know of what

it is composed? This means an exhaustive chemical analysis which may be either qualitative, that is, the particular elements of its composition, or quantitative—the amount of each element composing it. Do we wish to know how it is made? If so, this will involve another type of investigation. For the purposes of the office manager, however, the most general need will be to know something of its use, or some particular fact concerning that use. And even here the purpose will have to be still further limited. We may wish to know whether or not a certain carbon paper will serve our needs. The question then arises, what are our needs? We need, let us say, a carbon paper which will (1) make satisfactory copies, (2) make a sufficient number of such copies, and (3) be economical in use. Even these simple needs require three distinctly different types of investigation and experiment. First, what is a satisfactory copy? Is it one that can just be read by a person with good eyes, or a copy so conspicuous that it can be read even by a person with passably good but weak eyes? And what kind of light shall we use to make this test? There is a tremendous difference between daylight and weak artificial light, and little experiment is needed to show that copy which cannot be read under artificial light can be easily read in diffused daylight, which may be several thousand times the intensity of the former. Second, when we consider the number of copies we desire to secure, we immediately recognize that this will depend entirely upon (1) the thickness of the paper, (2) the thickness of the carbon paper, and (3) the strength or force of the impression made, as well as the particular grade of carbon coated on the paper. Third, the economy of use at once brings in many other factors, such as price, longevity, manner of use, kind of persons who will use it, conditions under which the material must be stored and used, and so forth.

All this is a simple investigation, but to start it without a definite plan and a strictly limited objective would result in much wasted effort and little practical result, yet this is precisely the manner in which many tests are made under the pretense that they are really scientific investigations.

In order, then, to set the tests within the proper limits, it is necessary to make a preliminary survey of the problem to secure a correct perspective of it, to note what has already been done by others, to judge just what can be investigated and what is beyond

the scope or possibility of investigation, with the means at the command of the investigator.

When the problem has been stated in its simplest terms, and a rigid objective fixed, an exhaustive study should be made of the available literature on the subject. If there is a public library available, the problem may be taken to the librarian who will get out the references on the subject, which should then be studied carefully. The matter may then be discussed with anyone who may be presumed on account of the nature of his knowledge and experience to be acquainted with the subject. All that has been published on it should be known before a single test has been made.

A word of caution is necessary here—it should be certain that the information given is correct. There are three ways to determine this: (1) Most scientific experimenters give not only the results of their observations but the method by which they were made, so that the reader can judge for himself whether the method followed was correct or admitted of a possibility of error; (2) the eminence and reputation of the authority must be considered—a popular story should not be given as much credence as the statement of a person known for his careful research and investigation; and (3) the reader can frequently make a test to check the correctness of the observation described, though it is not possible to do so in all cases.

Misinformation is plentiful, rampant, and often very tenacious of life, even after its falsity is known.

Determining the Method of Making the Test

Assuming that the problem has been correctly formulated, the previous work of others known, and all information verified, the method of making the experiment must now be thought out and decided upon.

Usually it is not possible to make a satisfactory experiment unless the conditions to be tested are magnified, diminished, or their proportions in some way changed for convenience in testing. For example, if it is desired to find, by means of a scientific experiment, how long in the ordinary course of use the mechanism of a filing drawer will last, it would be neither necessary nor practical to use such a drawer in the ordinary manner and record results over a period of years. This test—it

has already been made—was carried out by constructing an apparatus which would mechanically pull open and slam shut a loaded file drawer, and this was kept in action until the drawer mechanism collapsed. In this manner the element of time was condensed by repeating the operation at short intervals, instead of comparatively long ones, as would be the case in ordinary use.

The purpose of this condensation, exaggeration, or magnification is to secure the control of some particular element of the problem, and to eliminate variables which are likely to creep in and destroy the validity of the results.

Eliminating or Controlling Variables

In every problem subjected to experiment and test, there will be certain variable conditions which must in some manner be controlled, if that is possible, or if not, they must be allowed for, so as to leave a margin for safety and certainty; that is to say, the allowance should be somewhat greater if otherwise uncontrollable variables are involved, than if based on a supposed stable condition. For example, in the test of the filing drawer, the variable of the manner in which a filed drawer is handled appears. It is obvious that if gently handled the construction will last much longer than if violently opened and shut. This variable—the manner of handling—was not, and could not, in any scientific test, be eliminated, because at that point the human element entered into the problem. But it was allowed for by constructing the mechanical device so as to give the drawer rougher treatment than usual, thus allowing a large factor of safety. This test, however, did not take into account the variable of the effect of different atmospheric conditions upon the bearings and in this respect was limited to the one variable feature of the operation of the drawers under normal conditions. The atmospheric conditions in the average office would not be appreciably harmful to the mechanism, and it is not necessary to test any elements which do not really affect the problem. At the same time, the greatest care should be taken to reduce to a minimum any possibility of error in observing the test of a single element.

In devising or determining the methods for making any experiment, the above-described points must be carefully considered, and in this consideration it is probable that apparatus of some kind will have to be used. It is not advisable to construct appa-

ratus if instruments of the proper sort may be found, and at a reasonable price, for apparatus made by experienced instrument makers is usually much more accurate than any amateur or home-made device. While it is possible, for example, for anyone to make a simple photometer for measuring the intensity of light, it would have to be calibrated very carefully with an instrument known to be correct; otherwise the readings would have little scientific value. In such case it would be better to purchase a calibrated photometer from an instrument maker.

In connection with the subject of apparatus it is well to remember that there are already in use many different types of devices for measuring weights, liquids, solids, electric currents, light, heat, strength of materials of all kinds under all sorts of conditions, and other objects and phenomena that at times must be subjected to test.

When the method of making the test has been finally determined, the apparatus to be used, the manner of observation, and so forth, should be committed to writing, so that it will be possible for each observer to use exactly the same method of observation.

An Important Point

A word of caution is perhaps necessary here. The definite purpose of the experiment should never be lost sight of. There is a constant danger of shifting or changing the experiment to accommodate the apparatus. If it is found that the apparatus used will not correctly determine the point or matter for which it was selected, then it must be discarded and replaced by one which will do the work and do it correctly. Under no circumstances must the experiment be sacrificed to the apparatus. For this reason it is incumbent upon the experimenter to secure beforehand as wide a knowledge as possible of the available means for making the experiment.

Before beginning the observations, a method for recording the results should be devised, so that it will be possible to record immediately and in final form to save copying, all observations *at the time they are made.* This is of primary importance, for if observations are not so recorded, they are unreliable, becoming less and less reliable the longer the recording is delayed.

The date of each observation should also be correctly recorded, as failure to do this may entail much useless work. Taylor

recounts an instance of this omission, in the case of certain sets of experiments, some of which it was discovered afterward were made by the wrong method, and, because none of the record sheets was dated, it was not possible to distinguish the valueless records from the useful ones, the result being that the entire set of experiments had to be made over again. This is a common oversight, as at the time of making the observations the mind of the experimenter is not usually focused on such details, and it is dangerously easy to overlook them. Provide a place on each sheet and see that it is filled.

In addition, every other detail that might conceivably affect the problem should be also recorded, such as the name of the observer—in some cases the sex and age, the type of apparatus used, a description of the material worked upon, if any, the tools, and so on. If atmospheric conditions are important, the temperature and humidity should be measured by a psychrometer. If the personal element enters into the problem—as it often does —the name, sex, age, experience, and any physical defects which may exist, may have to be mentioned. If a machine is used, its name, make, model, and even serial number should be recorded. In such matters it is always better to have more information than seems necessary, than to have less, for in the study that must afterward be given to the data thus accumulated, certain elements may depend upon information of this type. For example, if a test is being made of a dictating machine, it would obviously be necessary to know whether a man's or a woman's voice was being tested; or if a test of something that required reading was being made, the normality or otherwise of the eyesight employed would be an element of importance.

Even where great care is used in the making of observations, lack of knowledge of some underlying law relating to the subject may introduce errors, which in turn may be detected by carefully made records which give all the necessary facts.

Eliminating the Human Element

In all experiments the human element is present to a greater or lesser degree. It is notoriously variable and unreliable, and wherever possible it should be eliminated or, if not, minimized to the smallest possible degree; in all cases it should be controlled or allowed for.

Only in some experiments upon or with automatic devices is it possible to eliminate the human element, and even here it is often present to an annoying degree. Even in experiments in mechanics, physics, or chemistry, where most of the laws are accurately known, the human element manifested in the fallibility of the observer enters.

In all observation, even the simplest, there is possibility of error attributable to this cause. If one were to weigh a certain object several times, even with most accurate scales, there would be slight variations in weight each time. They might be caused by air currents, or the presence or lack of certain accretions such as dust or moisture, or they might be caused by errors in observation. If this is true in such a simple, commonplace method of observation as weighing, it is much more true with observations the nature of which is not so well understood.

To eliminate, minimize, or control this possibility of human error in observation, there should always be a sufficient number of observations taken by a sufficient number of persons, so that the minimum of possible error can be achieved.

In comparing a certain number of observations made on one subject or object, we always find that no matter how carefully they have been made, they will differ slightly one from the other. This variation is due to two causes, the imperfection of the instruments of measurement, and of our own senses. These variations must not be confounded with palpable mistakes, such as occur in observations where a number is recorded incorrectly or the experiment improperly performed. Results due to the latter causes should, of course, be entirely rejected and not considered in any way in reaching our conclusions.

If we knew the true value and subtracted it from each of our measurements, the difference would comprise the total error, and this can be divided in two parts. First are constant errors, such as known imperfections in the apparatus, or tendencies on the part of certain individuals to estimate certain quantities either too high or too low. When we change the variables, these errors often occur also but generally according to some definite law. When we note that they alternately increase or diminish the results at regular intervals, they may be called periodic errors. If we know their magnitude, they do not harm, since we can allow for them and thus obtain a value as accurate as if they

did not exist. The second division of the total error is due to some unknown defect in our apparatus. Such errors may be called accidental errors and are unavoidable.

Studying the Results of the Experiment

After the experiment has been completed, it will then be necessary to study the recorded results to determine just what has been discovered. It is frequently the case that the results will be negative—in the sense that they prove nothing—and in such case the method of making the test may be called in question.

In order to discover any law that may be involved, it is often advisable to chart the results shown in the records. This will facilitate visualization and bring out points that would not be so instantly evident from an examination of the figures involved.

How to Organize Scientific Analysis Work

It cannot be expected that work of this nature can be performed in the spare time of any executive. Definite time must be allotted to it, and the amount so allotted will naturally depend upon several factors: (1) the necessity for it—in the reorganization of a poorly managed office, much more time should be allotted than would be considered necessary in an office that was functioning fairly well; (2) the availability of personnel—in small offices there may not be more than a certain amount of time available for this work; (3) the size of the office—a large office can afford to spend much more for scientific research than a small one.

To be really effective, this work of analysis must be the responsibility of the management itself and should be an integral part of the organization. Really expert consultants, from outside the company, however, are valuable as guides or teachers to a member or members of the office organization who have been entrusted with this work and, if the office is large enough, it would in most cases be more economical to consult them, but in no case is it profitable to allow an inexperienced person to carry on the work and purchase his training at the expense of his mistakes.

The work of the outside expert is profitable because of the teaching and guidance he gives the organization in helping it

solve its own difficulties and assisting it in the development of a method of scientific control especially adapted to its particular conditions. When such a consultant is employed, it is best for the organization to arrange his services on some basis that will enable him to spread his work over a long period of time, rather than endeavor to have the work concentrated into a space of short duration. The best consultants prefer a plan which enables them to serve a client 52 days in the year, 1 week apart, rather than 52 successive days, for the reason that far better service can be given by the former method.

What Results May Be Expected from Scientific Analysis?

Conducted in the manner outlined in this chapter, scientific analysis may be expected to produce the following concrete results:

1. A better handling of the general work of the office, improved coordination of all the functions of the business, and, in consequence, the production of a better and more profitable organization.
2. A much more economical handling of the work, through the better training of clerks and the elimination of superfluous effort.
3. The creation of a superior morale, for well-trained clerks, working in a well-organized office, have a contented environment for their activities and consequently develop interest, ambition, and pride in their own work and that of the organization as a whole.
4. The development of the scientific control of the office activities in every department.

These results may be confidently expected from scientific analysis work, carefully planned and organized, and thoroughly carried out in actual practice.

Questions for Discussion

1. What does "scientific analysis" signify, and what are six requirements involved in its execution?
2. What is "scientific thinking" and why is it so called?
3. Why is it necessary to define one's objective formally?
4. Comment on the formal definition of the objective.
5. How would you proceed to analyze a problem?
6. What does the collection and interpretation of the facts involve?
7. Can an executive do this work in his spare time? Why or why not?

8. If an analysis of the problem has been carefully made, what will it show?

9. What should an observer do about glaring defects which he notices during his observations? Why?

10. What is the chief difference between an ordinary experiment and a scientifically conducted one?

11. What is the classic example of the application of science to business?

12. How many recorded experiments did Frederick W. Taylor make in trying to find out what constituted a day's work for a machinist? What is the significance of that fact?

13. Define or explain the term "scientific experiment" and comment on it.

14. Explain in detail how you would test carbon paper scientifically.

15. Why is a preliminary survey necessary?

16. Would it be well to examine the available literature on the subject of an investigation? If so, why? If not, why not?

17 How would you determine whether the information in the literature is correct?

18. Why is it sometimes necessary to magnify, diminish, or change the proportions of some conditions to be tested? Illustrate your answer.

19. How may variables be controlled or allowed for? Why?

20. Which is better, to make one's own testing apparatus, or to buy one made by a craftsman? Why?

21. Comment on the recording of the results of an experiment. When should this be done? Why?

22. "It is always well to have more information than seems necessary." Why?

23. Why should the human element, present in all experiments, be eliminated, minimized, controlled, or allowed for as much as is possible? How may this be done?

24. Comparison of all the observations made on the same subject or object will always show some variations. To what are these variations due?

25. Explain the term "total error," and state the two parts into which it may be divided. Why is total error important?

26. How and why are the recorded results of an experiment recorded?

27. How should scientific analysis work be organized?
28. Comment on the use of outside expert consultants.
29. What results may be expected from scientific analysis?

Problem I

It is a well-known fact that forms printed on blue paper are difficult to read under certain circumstances. How would you proceed to make a scientific experiment to determine just what is the best color or tint to use for forms upon which there is much writing and reference?

Problem II

The Western Pencil Company has been having trouble with its filing system. Department managers declare that frequently they cannot find previous office correspondence. The office manager states that he has had three different file clerks in the past three months, but that each resigned after working a few weeks.

How would you proceed to analyze this situation to determine what, if anything, is wrong?

XXII

THE MEASUREMENT OF OFFICE WORK

It has been well said that the possibility of measurement is the beginning of all science, and the science of management is no exception. When management depends upon such unstable and indefinite things as offhand judgments, "hunches," and luck, there can be no science and but little progress; but when results accomplished can be measured and compared with a definite standard, when the accomplishments of an executive can be definitely measured and the efficiency of a worker can be compared, not with other workers who may or may not be efficient but with a definite standard or unit of measurement, then and then only can science in management be said to appear. Until then there is no foundation upon which to construct a science.

The Purposes of Measurement in Office Work

There are four main purposes of measurement in office management:

1. For making an over-all measurement of such management. That this is a necessity is too obvious to require argument.

2. The management will also desire at certain intervals to measure the effectiveness of some particular department or feature in the office organization.

3. It is also desirable to have some method of measuring the efficiency of the clerks. It is not sufficient to know that Mary Smith is a fast worker and seems to keep busy all day, or to know how many letters are written, or invoices, postings, and so forth, are made, unless at the same time one knows how many should be made.

4. For the purpose of controlling the work by sections and departments, a method of measuring the work on hand, the work received, and the work performed is required.

The Importance of Measurement

It may be admitted at the outset that office work is difficult to measure, much more so than work on a machine in a factory,

more difficult perhaps than any other kind of productive work. Possibly for this reason mainly, few office managers attempt its measurement.

Among the various excuses, objections and explanations offered to extenuate neglect of such measurement are the varied character of the work, the different times required per piece for the same kind of work, the cost of measurement, and the utter impossibility of measuring certain kinds of office work.

These objections, though far from valid, must be given consideration, for all contain some truth. Thus, it must be admitted that the varied character of office work makes measurement difficult, but this is by no means an admission that it is impossible. It may, for example, be claimed that even no two letters are alike—unless they happen to be form letters; that a clerk may be required to do 50 different things, and perhaps 8 or 10 different kinds of work in a day, and it must be agreed that work in such case is difficult to measure.

Again, in many cases, though the worker may be engaged in doing the same kind of work, each piece will require a different time to do. Thus, such work as making invoices seems at first glance to be readily measureable, but when we count the entries upon different invoices we find that they vary from one to perhaps a hundred items. But even so, the work is entirely measurable.

The next objection, the cost of measurement, is merely based upon the assumption that it is high, an assumption made simply because the subject has been given no consideration. Superficial observation may seem to show that it would require as many clerks to count the work as to do it, but this is an utterly unfounded apprehension. The work of counting can be done easily, inexpensively, and profitably also.

Finally, it may at once be admitted that there are certain kinds of work which in their very nature cannot, and never will, be measured. Thus, it is impossible to discover how long it will require a person to think out a plan, compose a difficult letter or draft a report, and we cannot conceive of any device being invented to measure these, or similar kinds of work. They must be frankly admitted to be immeasurable, but at the same time it should be remembered that they form but a very small part of the general office work.

While all these objections are admitted for what they may be worth, the stubborn fact remains that if the amount of work done is not known, the office manager cannot compare it with what should be done, and this in turn means that he cannot know whether he is managing the office efficiently, or keeping on the force more clerks than are actually required. Neither can he know, in such case, what volume of work there is to do; and not knowing this, he cannot judge what working force is needed.

Finally, he has no reliable method of judging between good workers and poor ones. If he must discriminate between them by casual observation and guesswork, the clerks will accuse him—though perhaps not openly—of favoritism, and many of them will feel that their work is not appreciated. They will, in short, consider that he does not know, and in this they will be perfectly correct.

These are the conditions that confront the office manager, when the problem of measurement, for the first time, comes up for consideration, and they constitute real, not imaginary difficulties, and to some seem impossible to overcome. So formidable do they appear that it is not surprising that office work is rarely measured, or that such work as is done is either produced by driving and needless exertion, or that some office managers attempt the solution of the problem by having a surplus of clerks.

Yet in another sense, it is equally surprising that so few office managers have attempted to overcome these difficulties by some approach to a scientific procedure. Those who have done so have discovered that the problem, though difficult in parts, is nevertheless to a very large extent possible of solution, and they have not only made great progress by their attempts in this direction but have found it most profitable besides.

The Need for a Unit of Measurement

Measurement of any kind must be in terms of a unit, and the kind of unit to be used depends, of course, upon the purpose of the measurement and the end to be achieved. It is true that a single unit may be used for many different kinds of measurement, but such usage is not always convenient. In some cases a very minute and accurate measurement is needed; in others

one less fine will serve equally well for the purpose and be much more convenient besides. In short, the end to be achieved determines the kind of unit to be used.

For very fine measurements of length, the engineer or scientist may use either the metric system with its millimeters, or the inch scale divided into thousandths or even millionths. The unit in such cases is either the millimeter or the inch or some definite fraction thereof.

For ordinary measurements, such as those used by a carpenter or cabinetmaker, working by hand and with hand tools, the inch and foot are sufficiently accurate, and the divided foot rule is an adequate instrument. A carpenter relies mostly on his eyesight for the measurements he needs. He does not know how to use a micrometer, and if he did, he would have no need of it in his work, the foot rule with divisions of inches and fractions of inches being sufficiently accurate for all his purposes.

In surveying, measurements of hundredths of an inch are occasionally used, but ordinary measurements are made in feet, yards, rods, and miles, according to the nature of the object to be measured.

Requirements of a Unit of Measurement

To qualify for acceptance as a true unit, the first requirement is that the unit decided upon must be standard and unchanging. In past days, before the importance of accurate measurement was understood, thumbs, hands, and feet were used as units of measurement of length—most changeable and indefinite forms of units. Only after standard units were adopted did the foot and the twelfth part of a foot have any fixed meaning. The unit must be scientifically determined, recorded, and made known.

In the second place a unit of measurement must be comparable, that is, one unit must be possible of comparison with another. One hand is not comparable with another on any basis of accuracy, nor one human foot with another, but the yard measure used in the United States is measured from and based upon a standard yard in the Bureau of Standards at Washington.

It is not necessary that every unit of measurement should be mathematically exact in all cases, but it must be sufficiently

so to serve the purpose for which it is used. An astronomical measurement of the sun or planets will be sufficiently accurate for all practical purposes if it comes within even a hundred million miles of being exactly true, while an airplane part may have to be machined to one ten-thousandth of an inch.

The Unit for Over-all Measurement

When the general efficiency of the office management is to be measured, some standard unit of accomplishment must be used. Office management is a subject of very wide scope if we consider all the things comprised in it, but, if we remember that its purpose is to secure certain results, it is evident that the results are to be measured, and not the means used to get them. For example, the arrangement of an office has a very decided effect upon results; so, too, have equipment, and light, heat, and ventilation. If, however, we can determine a unit by which to measure the results, whether with good or bad arrangement, equipment, light, heat, or ventilation, we shall be able also to determine the general effect of the improvement of whatever defects may exist, or the loss incurred by their continuation.

As we have seen, this unit must be standard, unchanging, and comparable, and it must be sufficiently accurate for the purpose desired.

In most offices, the order, or some similar unit, satisfies all these requirements. In a mail-order house, a manufacturing company, or a sales office, the main purpose of the office is to handle orders, and practically all the work of such offices will revolve around the order. It is true that the mail-opening, stenographic, bookkeeping, and some other departments will be engaged only indirectly upon orders, but the fact remains that if the quantity of orders were reduced, there would be less work in these departments, and if increased there would be more.

The order in a mail-order house may be entirely different from that in a manufacturing establishment, and it will, therefore, be necessary that each company shall consider its own orders and its own routine, when using the order as a unit. That is to say, no arbitrary figure can be taken, or borrowed, or imitated from others. This, however, does not prevent comparison with others, for in a general way the routine of handling orders in all companies is similar in essentials.

Clerical Minutes per Order

If an office handles 100 orders a day and requires 100 clerks to perform all the operations on them, it is evident that 1 order requires 1 day's time of 1 clerk. But since the working day is not identical in all offices, a smaller unit should be used—say, the hour or the minute. With a working day of 8 hours, the above example would require 480 clerical minutes per order.

Very frequently mail-order institutions build up a large amount of routine which is apparently only remotely connected with the handling of an order; notwithstanding this fact it is true that almost all the essential work of the office is dependent upon the order. No orders would mean no clerical work except that devoted to endeavoring to get orders. There would be little mail to open, no invoicing to be done, no credits to be examined, no accounts to be posted, and very little correspondence. Therefore, in those offices which exist for the purpose of handling orders, it is evident that the order is the logical unit of measurement, and thus the number of clerical minutes required to handle such an order becomes the definite form of measurement of efficiency of such office organizations.

In the example quoted, 480 minutes was used only for explanatory purposes, and when one considers all the steps in even a complicated routine, it does seem extravagant for any order to require that much time. But it will usually be found that much more office work is expended on the *indirect* operations connected with a routine than upon direct ones. The National Office Ratios Survey, under the chairmanship of Mr. Leffingwell, revealed a variation in the clerical minutes per order of from 18 minutes—the best record—to 3,456 minutes—the worst. There are many offices where 480 minutes are expended on each order.

It is evident that the clerical minutes required for the order unit will fluctuate as the number of orders varies from day to day. This is not because the unit varies, but because it is usually necessary to keep on hand a force sufficiently large to handle the peaks, and naturally when there are fewer orders, there must be a certain amount of idle time.

It may be objected that, as orders even in the same establishment are not alike, the order is, therefore, an unstable unit,

and at first glance it might seem so. The exceptional order with many items will always be brought forward to sustain this objection, but if the orders are critically examined it will be found that the mode is usually an order of but two or three items.

In many offices will be found several classes of orders, requiring different amounts of work to handle, and in such cases the relative difference in the amount of work involved must be determined and the various classes weighted accordingly. That is, Class 1 may be taken as the standard unit; one order of Class 2 may equal 1.5 of the standard, and one order of Class 3 may equal only 0.5 of the standard. So if there were 100 orders of each class, there would be 100 plus 150 plus 50, or 300 units.

In other lines of business where the order does not qualify as the proper unit, or where there are no orders to be handled, some other unit—the most important—can be found. Thus in an insurance office, the policy might be used as the unit; in a department store, a sales transaction might serve the purpose, though a sales transaction is essentially an order but does not involve the extensive routine of the written one.

But whatever the unit may be, all work should be measured by it. If, for example, there is an estimating department, where estimates are prepared for prospective orders, but where all estimates do not result in orders, the unit would be the orders received, whether on an estimate or not. The management could thus determine how many clerical minutes per order received were spent in the estimating department. All special work should be included in and measured by the same unit.

A Unit to Determine Cost of Certain Features

For this purpose the order or similar unit will serve for all activities, if it is remembered that the measurement refers to only a section of the office and not all of it. By computing the number of clerical minutes expended in the bookkeeping department, and dividing it by the standard order unit, the number of clerical minutes per order devoted to bookkeeping can be determined. By dividing the office into sections, the clerical minutes per unit required in each section can readily be determined in the same manner.

Thus the management can at all times determine just how much a certain portion of the work is costing, and when this is

done, attention is immediately attracted to those portions which seem to be costing proportionally too much. This is one of the most valuable features of the method of measurement by units. But it must be remembered that the knowledge of what any specific work is costing gives no indication of what it *should* cost.

A Unit for Measuring Clerical Output

In devising a unit for measuring clerical output, it will be found that the order unit, satisfactory as it is for over-all measurement or the measurement of any particular feature, is not at all suited to this purpose. It would, besides being inaccurate, be most unwieldy and inconvenient, for instance, to measure an operation which required one minute to perform, by making it as one four-hundred-eightieth of a unit.

For this purpose the method described below has been found perfectly satisfactory. By its use the relative efficiency of each clerk can be quickly obtained, and the work of a stenographer may be compared with that of a file clerk or a bookkeeper. Some definitions are necessary, since without them some of the technical phrases used would be meaningless.

Time Unit.—A time unit is one hour. An eight-hour day, therefore, contains eight time units.

Standardized Operations.—Operations are considered standardized when they have been analyzed, improved, established, and time-studied, and when a standard rate of production for them has been set.

Unstandardized Operations.—Operations which have not been studied as above, or which are not considered sufficiently important for such study, are called "unstandardized operations."

Work Unit.—By this term is denoted the standard production in one hour on an operation. Thus, if standard 1 demands performance at the rate of 1,000 an hour, 1,000 is 1 work unit for this operation; 5,000 is 5 work units, and so on. If standard 2 demands but 500 per hour, then 5,000 is 10 work units.

Rules for finding the rate of efficiency.

1. One hour's production at the standard rate equals one work unit.

2. The actual production, divided by the standard production per hour, equals the number of work units produced. Thus, if 2,000 of standard 1 are produced and the rate on this standard

is 1,000 per hour, it is clear that the production is equivalent to 2 work units.

3. The number of work units produced, divided by the number of hours worked, or the time units, equals the percentage of average efficiency throughout that period. If, for example, the standard rate is 1,000 per hour, and 2,000 are performed in 2 hours, the method of figuring would be as follows:

Work units produced..... 2
Divided by time units..... 2 = 1 or 100 per cent

Or take another example:

Work units produced..... 1
Divided by time units..... 2 = ½ or 50 per cent

In order to eliminate as much figuring as possible, tables may be prepared for different rates of production.

With this method it is unnecessary to account for any time, except that expended on unstandardized operations or in idleness, it being assumed that the balance is expended on standardized work. Thus, if an operator worked two time units—2 hours—on unstandardized operations, and was idle one-half a time unit—½ hour—it is assumed that the balance of the day—5½ hours—was occupied on standardized work. It makes no difference on how many standardized operations the employee worked, the method will show exactly what the percentage of efficiency was. The method of keeping track of the amount done is kept by each operator on special slips of paper.

For timekeeping on unstandardized operations, a slip similar to that shown in Fig. 19 is used. This slip is taken to the head of the department, or some person delegated for the purpose, who punches on it the hour the operator begins on the unstandardized work, and when the work is finished, the slip is again punched. The space shown upon it between the time of starting and finishing the work is easily figured in tenths of an hour, such figuring to be done by the operator so that it may not have to be done by someone else. One of these slips should be provided daily for each operator and should be turned in at night.

At the end of the pay period, the figures shown on these slips are totaled, and the entire amount of time spent on unstandardized work and in idleness, figured in time units, is deducted from the number of time units in the pay period. It is assumed that

the remainder represents the total time units expended on standardized operations. Inasmuch as the relative efficiency is reduced as the proportion of time units to work units increases, it is incumbent upon the operator to report the duration of all periods of waiting for work, in order to get full credit for efficiency

Date _____

Name

	6	12	18	24	30	36	42	48	54	60	
	1	2	3	4	5	6	7	8	9	0	
8											9
9											10
10											11
11											12
12											1
1											2
2											3
3											4
4											5
5											6
6											7

Total Units

FIG. 19.—Slip for time on unstandardized work.

while working. This procedure, therefore, acts as a valuable control of this most difficult problem—of which, more later.

This plan, it will be readily seen, enables the efficiency of any worker to be accurately compared with that of any other. In addition, it furnishes a ready means for the payment by results.

The Start of Measurement Work

The measurement of office work must, of course, start with those things that can be definitely measured; from thence proceed to those more difficult to measure, but still measurable; and stop at those things which are clearly immeasurable. With these limits established, there is nothing to prevent the full extent of possible measurement.

In the necessary preliminary analysis of measurable and immeasurable work, the heretofore timorous office manager will discover—possibly to his great surprise—that the measurable work constitutes from two-thirds to three-quarters of all the work done in his office, and effective control of this preponderating portion of the work will mean definite progress and a most decided improvement in conducting the activities of the office.

It should be distinctly understood, in this connection, that control, in the scientific sense, is impossible without measurement.

Different Ways of Measuring

Office work may be measured in three different ways: (1) by actual count of pieces, (2) by the use of a scale of some sort, and (3) by measuring the average time required.

In using the first method—the actual count of pieces—a survey must first be made of all the pieces of work in the office which are equal to one another and can therefore be counted.

A large part of the repetitive work can be measured in this manner. Thus, when the mail is being opened in the morning, the pieces can be counted; after it is opened and sorted into different classes, the number of pieces in each class can be counted—and this, by the way, can be used as an effective control figure to indicate the amount of work that comes in. Mention could well be made here of the mail-order houses, which weigh their mail before opening, and thus estimate the volume of work therefrom. Envelope addressing is another task that can be readily counted, as can the making of invoices, bills, entries on cards, and similar jobs. It may be urged that addresses on envelopes are not the same length, or, with more reason, that one invoice may have more entries than another. The answer to this objection is that the items on a month's invoices can be counted and the figure divided by the number of invoices, to

obtain the average number of items on each. The result of counting of this kind is generally surprising, for while there will be a considerable number of invoices containing from 20 to 30 items, it will make but a small difference in the average, because of the far greater number of invoices containing but 1 item. An analysis has shown the average number of items per invoice to be from 3 to 5, according to the type of business. In a music-publishing business there was an average of 15 items per invoice, though the management had thought the average would be nearer 25 or 30 items.

Circular-letter writing, folding circulars, stamping and enclosing them, and repetitive tasks of such nature present no difficulties in counting.

There are several different ways of counting, first, of course, being the actual, numerical count. Second, if the finished work is stacked in piles each containing an equal number of pieces, as 10, 25, or 50, the stacks can be counted and the labor thus greatly reduced. Third, there are many cases in which measurement with a scale or an inch rule will give a satisfactory count. Thus, cards or sheets of paper can be piled, first counting 50 or 100 in one pile, and then making equal piles of the remainder. In the fourth place, weighing will often give a more accurate count than any other method, if the weight of 1 or 10, or some other unit, is known. Envelopes come as a rule in boxes of 250, and the work can be counted by the box if so desired.

How to Measure Typewritten Matter

Typing is ordinarily measured by counting the work in one of three ways; the number of keystrokes, the number of square inches, or the number of standard-length lines. Keystrokes are counted by a device which, when attached to the typewriter, counts the actual strokes as they are made by the typist. This is the most precise method of counting typewriting, since every stroke registers. The device is geared to show one figure for 10, 100, or 240 keystrokes, in order to simplify the computations.

To count by the number of lines, a scale is used which can be easily made by typing on a strip of paper or cardboard the figures 1, 2, 3, and so on, in a vertical line, single or double space, as desired. By laying this scale on the sheet of typed matter, the number of lines can be read at a glance. A standard line may be

of any desired length; 6 inches is frequently used. Since varying lengths of line will vary the output record, typists should always be instructed to use the same length of line. This is difficult in letter transcription, since typists are taught to place a letter on the page so that it will look well; a long letter, written in long lines, will fill the page; a short letter will look better if short lines are used. Thus the line-counting method may offend the aesthetic sense of the operator.

The square-inch method is also widely used. One square inch of typewritten matter is the equivalent of a 6-inch line—60 spaces or keystrokes of pica type, and 72 spaces or keystrokes of elite. To count the number of square inches, the Leffingwell typewriter scale was devised. By laying the upper left-hand corner of this transparent celluloid scale over the corresponding corner of the matter to be measured, the number of square inches can be read directly at the lower right-hand corner of the matter. The work is quickly done, from 5 to 10 sheets a minute being measurable. This scale can be used for measuring the square inches of any kind of work, such as statistical tables or other tabulated matter. A separate standard of measurement will, of course, have to be used for each kind of work.

In measuring a letter by the square-inch method, 2 square inches are added for the date line, name and address, salutation, complimentary close, and signature. While this allowance is only an estimate, it will average out in the long run, and the actual difference either way is insignificant. Since single-spaced letters are ordinarily double-spaced between paragraphs, 1 square inch is deducted for each paragraph.

The figures on the Leffingwell square-inch scale are computed for single-spaced matter; double-spaced matter is therefore one-half the figure shown on the scale. If the typed lines vary in length, the average-length line is used instead of the longest or shortest lines. This fact means, of course, that the square-inch method is only approximate.

Is Approximate Measurement Acceptable?

To the possible objection that approximate measurement is not measurement at all, it may be answered that one is warranted in measuring within satisfactory limits, no matter what is being

measured. Limits in one case, however, may be entirely different from those in another; for a carpenter to measure within one-sixteenth of an inch may be close enough for most work, while a machinist must often have his work accurate to a ten-thousandth of an inch. On the other hand, in some astronomical measurements, as has previously been stated, the observer may be satisfied if his calculations prove correct within the limits of a hundred million miles. In office work, the slight variations in each of the three methods described are of little importance, and the cost of more accurate measurement may be more than the effort is worth. It is far better to measure by the grossly inaccurate line method, than not to measure at all, as a trial will demonstrate.

A job may be so full of small details that it would be unprofitable to count them, and besides many of these details might be different on jobs of a generally similar character. In such case the job itself should be measured by time, and in setting standards, the average time for such job should be figured. Thus, the work in connection with getting out some particular report may include the copying of certain statistics from several different sources, and then making this up on a standard work sheet for the typist to copy from. Such work may involve many miscellaneous details which cannot be counted, and in such cases, the work in all its details, up to the making of the work sheet, should be counted as one job.

When to Do the Measuring

This will vary with the character of the work. If, for example, it is the addressing of envelopes or folding of circulars, or other similar repetitive job, the work can be counted when it is assigned; that is, the worker can be given sufficient material for one hour's work. If it is a single job which may take several hours to finish, the time can be estimated on the assignment sheet, and the estimated time checked up against the actual time when the work is completed. If it is work consisting of the transcribing of letters from phonographic records or stenographic notes, or the copying of a piece of manuscript on the typewriter, the work must be measured after it is completed. For planning purposes, however, the amount to be done will have to be estimated beforehand.

How Work May Be Recorded

For control purposes, the work may be measured by either individuals, groups on special work, or groups on routine work.

Measuring and recording of work by individuals should be done wherever possible, as this classification will enable the planning clerk to differentiate the relative efficiency of individuals. In all work done as a completed operation by an individual, such as the work of typists, stenographers, phonograph operators, entry clerks, and the like, the measurement and recording should be done individually.

Where work is done by a group, and it is difficult to determine the amount done by any one individual, or where the spurting ahead of an individual would have no effect in hastening the completion of the work, the measurement should be done by the group, and the efficiency of each individual in it recorded as the same as that for the group. But there are few occasions in office work where group measurement like this is necessary.

In all work which passes successively through the hands of a number of individuals, as in a routine, on a route sheet, the measurement will be done automatically by each individual in recording time received and time finished. Where there is a steady flow of work there is practically no opportunity for the clerk to make a dishonest report, and there are very few clerks, indeed, who would think of attempting it; so this measurement will suffice for all clerks working on routine.

Recording Methods

Methods should be devised to reduce the labor of recording as much as possible. If bonus is paid on the work, it should be figured on the number of standard hours in the pay period, whether that be one week or two, for the reason that bonus is to be paid on the average efficiency for that period and not on the efficiency shown for a few hours. The sheet upon which this report is kept should, therefore, contain sufficient space for keeping it up to the time of the pay period.

A card should be provided for each clerk, on which the efficiency record by pay periods is kept, and should provide space for at least a year's record. The results should be copied periodically on the employee's card in the personnel department.

In devising statistical reports for keeping track of the units of measurement, care should be taken to devise them so that the amount of time required for their compilation does not involve too much labor.

On the clerical minutes per order unit, the record can be extremely simple. Daily records are unnecessary and in fact inadvisable. Weekly records can be compiled by taking the standard number of minutes in a week, multiplying this figure by the total number of clerks, and dividing the product by the number of orders received for the week. Let us say that the office works 480 minutes a day for 5 days, which would mean 2,400 minutes worked by each clerk each week. If there are 100 clerks, they will work 240,000 minutes, and if 2,000 orders are received in a week the number of clerical minutes per order will be 120. A similar record can be kept for each section of the office.

A record of this kind enables the office manager to measure the over-all efficiency of his office from week to week and from year to year. Any improvement will at once be apparent, and a falling off in efficiency can be instantly detected. Moreover, he will be able to place his finger on that section of his office which is falling behind. Such a measure of progress is in itself a continuous spur to ever-better management.

For the measurement of individual output, a simple weekly record of the percentage of efficiency of each operator can be made with little effort. This record should be available at all times for inspection by the worker concerned, and can thus be used as an incentive by the office manager continually to induce the operator to do more and better work.

Departmental records will enable the office manager to see just what progress he is making. The total work units, divided by the time units worked, will show the average efficiency of the department on standardized operations; the number of time units on standardized operations will serve as a measure of the progress toward standardization, and the number of idle time units will be a measure of the flow of the work to and through the department.

Control Figures

In addition to the efficiency record of the individual and the measuring of the work in general as it is done, certain control

figures should be kept in the planning department. For example, if a certain number of orders were received in one day, this figure could be used to control the work done in the order routine, the shipping records, the invoices made, and the charges posted. Some offices also keep a control figure showing the unit around which the work of the office revolves, which, for example, may be considered as an order. Every order will then mean a certain volume of work to be done in all departments, and this figure will serve as a control.

Questions for Discussion

1. Comment generally on the measurement of management, and upon its relation to management as a science.
2. What are the four main purposes of measurement in office management?
3. What are some of the excuses given by office managers for not measuring the work of their offices? Comment on these excuses.
4. Why is a unit of measurement needed?
5. How accurate should the unit of measurement be? Illustrate your answer.
6. State three requirements of a unit of measurement and comment on each.
7. In the over-all measurement of office management, "it is the results that are to be measured, and not the means used to get them." Comment.
8. Would the sales order make a good over-all unit? Why or why not?
9. What did the National Office Ratios Survey show as to clerical minutes per order?
10. Why should the clerical minutes required for the order unit fluctuate from day to day?
11. What would you do if there were several classes of orders?
12. If, in some businesses, the order did not qualify as the proper unit of over-all measurement, what would you choose? Why?
13. "Whatever the unit, all work should be measured by it." Explain.
14. How can the office manager determine at all times how much a certain part of the work is costing? What relation does this bear to what the work should cost? Explain.

15. "For measuring clerical output, the order unit is not suited." How would you measure clerical output?

16. Define or explain:

a. Time unit.
b. Standardized operation.
c. Unstandardized operation.
d. Work unit.

17. How would you find the rate of efficiency? (Assume any figures necessary for the purpose.)

18. Show how time may be kept on unstandardized operations.

19. What are the two main advantages of the work-unit plan?

20. Where should the work of measurement start?

21. In what three ways may office work be measured?

22. Give several illustrations of work that can be measured by counting.

23. Describe three ways of counting work.

24. State three ways in which typewriting may be measured and describe each method in detail, stating its advantages and disadvantages.

25. Describe the measurement of typewritten work by counting the lines. What are the advantages and disadvantages of this method?

26. Explain fully the square-inch method of counting typewritten matter. What are the advantages and disadvantages of this method?

27. "Approximate measurement is not measurement at all." Comment on this statement.

28. How would you measure a job so full of small details that it would be unprofitable to count them?

29. When is the best time to measure work? Why?

30. Should work be measured by individuals or by groups? Explain.

31. Comment on methods of reducing the labor of recording.

32. What control figures should be kept? Why?

Problem I

The Wollaston Knitting Company has 110 clerks, consisting of the following:

Stenographers	14
Invoicing section	13
Accounts receivable	6
Order section	24
Accounting department	6
Statistical section	15
Credit department	10
Cost section	6
Traffic section	4
Export department	6
Filing section	6
	110

They receive an average of 240 orders daily. How would you figure the number of clerical minutes per order?

Which section or sections seem to be overmanned?

Problem II

In the office of the Brown Knitting Mills there are 14 typists, 7 of whom are stenographers. The work consists of typing form letters, addressing envelopes, transcribing stenographic notes and cylinders, making statistical reports, and typing credit information on cards. It is proposed to use a keystroke counting device on each typewriter, which records 1 point for each 100 key strokes.

Can this device be used satisfactorily and with justice to the employees? If so, what kind of system should be set up? If not, what other method can be suggested for measurement of the work?

XXIII

THE SETTING OF STANDARDS

The use of old methods of thought to cope with new tendencies and conditions is the sheerest economic waste. New ones must be evolved for this purpose, and a highly satisfactory method, tried, tested, and found eminently practical, has been evolved by modern business itself—that of scientific standardization.

Though essential to scientific control of business, standardization is far from being thoroughly understood.

The Formation of Work Habits

It is evident that if means and methods are mainly the result of chance growth, instead of careful thought, much waste is certain to occur.

Fortunately, just as there is an innate tendency for methods to gravitate to a kind of uniformity, so also there is a tendency for them to become fixed. Despite the waste involved, this tendency to the development of work habits is the one thing that makes any kind of control, however deficient, at all possible. For though the universal tendency of all things is toward change, nevertheless it is fortunate that all things do not change at the same time.

This tendency toward the formation of work habits should not be combated but should be consciously directed and used by the office manager. If careful, deliberate thought is exercised in guiding and directing the formation of a habit, when once formed it becomes a powerful aid in controlling.

Whenever a method has thus become fixed, it relieves the office manager of the burden of constantly giving it his care and attention. This fixation of desirable work habits, conditions, and environment is known as "standardization" and is essential to adequate control.

Definition of a Standard

A standard is defined as follows by Morris L. Cooke:

A standard under modern scientific management is simply a carefully thought out method of performing a function, or carefully drawn specifications covering an implement or some article of stores or product. The idea of perfection is not involved in standardization. The standard method of doing anything is simply the best method that can be devised at the time the standard is drawn. Standard specifications for materials simply cover all points of possible variation which it is possible to cover at the time the specifications are drawn. Improvements in standards are wanted and adopted wherever they are found. There is absolutely nothing in standardization to preclude innovation. But to protect standards from changes that are not in the direction of improvement, certain safeguards are erected. These safeguards protect standards from change for the sake of change. All that is demanded under modern scientific management is that a proposed change in a standard must be scrutinized as carefully as the standard was scrutinized prior to its adoption, and that this work be done by experts as competent to do it as were those who originally framed the standard. Standards adopted and protected in this way produce the best that is known at any one time. Standardization practiced in this way is a constant invitation to experimentation and improvement.[1]

If the natural tendency toward the fixation of work habits makes it possible for the unscientifically managed office to get the work out at all, it follows that their development and fixation, by the improved method of scientific standardization above described, will make full control possible.

The office manager should continually direct his efforts to having each operation, and the various actions and movements which constitute it, always done in exact accordance with the manner he has prescribed. He should insist on this, though it is possible or even probable that a different manner would accomplish equal results. The constant and rigid insistence on a specified routine of performance quickly results in the formation of correct working habits on the part of all clerks; this will reduce errors to a minimum, while making certain that standard methods of work are carried out. When clerks are trained and taught to perform work in a standard routine manner so that they have formed a fixed working habit of doing so, constant reference to the instructions for the permanent maintenance of the standards is no longer required, for there is no force so strong as habit.

[1] *Bulletin* 5, The Carnegie Foundation for the Advancement of Teaching.

The entire trend of modern office management is undeniably toward standardization of the work—the elimination of chance and uncertainty, wherever possible, and the substitution therefor of known and tested methods. This process, as a matter of fact, is the one outstanding proof that office management is becoming a more exact science, for, as we have seen, science itself is but organized, classified, and standardized knowledge.

There is not, and cannot be, any universal standard in office work, which will be applicable under any and all conditions. Standards must be devised for particular situations; yet these can be primarily determined only when the basic principles are known.

For their secondary determination, the factors are the physical conditions of location and plant, the particular quality and mental attitude of personnel, the particular kind of tools used, and lastly the work itself, all these being governed by local conditions.

Operations That Can Be Standardized

As with respect to the measurement of office work it was admitted that there were certain operations that are immeasurable, so with respect to standardization a similar admission must be made—there are some operations that cannot be standardized as to quantity to be produced. However, as in measurement, they also are a minor portion of all office operations.

It is possible also that there may be a few operations that should not be standardized, though capable of standardization; but this should not be assumed as a fact, as it has never been shown that standardization brings any evils that outweigh its advantages. It should also be remembered that where one person fails in his efforts to standardize any operation, another may succeed, for no doubt there are persons undertaking this work who are so constituted that they surrender too quickly to difficulties, and it will usually be found that they assume, without sufficient investigation, that because of the number of variables in some particular operation it is not capable of being standardized.

All work which can be measured as to quantity and quality can be standardized, though not, of course, with equal ease. The very fact that such work can be measured proves that the

variables it contains are not a barrier to standardization, as these variables themselves have been determined. It may be possible that there are cases where it would not pay to standardize, but that is an entirely different matter.

It is not indispensable that work should always be measured by individual performance, though that method is preferable wherever possible. Some kinds of work must be done by groups of two or more persons, but nevertheless, as we have seen, such work is measurable. In like manner, though the presence of the variable human element here increases the difficulty of measurement, the work of the group can also be standardized.

Work which is not measurable, either before or after its performance, cannot be standardized as to quantity, but there is nevertheless an advantage in making a study of such work, with a view to partial standardization and consequent improvement, for it is easily conceivable that the quality of such work can be standardized, at least to some extent. For example, the work of the standardizer himself is fully as varied as that of any of the operations with which he deals, and, though it is impossible to standardize his work as to quantity, it is highly advisable to discover the best methods of performing each element of the work and teach these methods to the persons who undertake standardization. So in jobs of a similar character, the standardizer can seek and specify the best methods of performance, and this will of itself result in immediate improvement.

How to Begin Standardization

In the development of scientific management in an office it is not advisable to begin at once the work of standardization; neither is it good practice to select at random some operation and standardize that. Before the work proper begins, there are several indirect, though important and necessary, steps to be taken.

The first step may be termed "prestandardization work" and involves a preliminary investigation into the working of all departments, with the object of eliminating the obvious wastes. In this investigation the observer looks for those wastes which creep into every organization and analyzes the routines for the detection of useless steps. This work will also include a study

of the forms for general elimination of waste, a study of reports for the discovery of those which are not serving an adequate purpose and other work of similar character. Such an investigation, if made in a thorough manner, will amply repay the effort it costs. It is not necessary here to go into details regarding what the observer will look for, as from what has been said before, ample leads can be obtained. One most important reason for conducting this investigation before the regular work of standardization begins is to so survey the grounds that efforts may not be wasted on standardizing operations that may later be abandoned.

After the prestandardization work has been completed, the regular work of devising and setting standards can begin. It is, as a rule, preferable to standardize first all the operations in the main routine so that they may be placed under control, but this procedure is not obligatory, for the work can actually be started anywhere. The factors determining where to begin are the general condition of the work to be handled, the strategical or psychological factors, and so forth. Thus, if at the time, the order department is engaged with an extra rush of work, it would be poor policy to disturb it by taking time off to standardize. Again, if the manager of a certain department is not inclined to cooperate, it is not wise to force standardization upon him, and it would be much better to begin in another department, where cooperation is assured, and let the force of example win the objector.

Aside from main routines, such detached operations as stenographic work, mailing, and similar work may be studied and standardized, but here those tasks should especially be selected which offer the greatest opportunities. Thus, if there were a large mailing force, standardization of the operations would yield good results, while if there were but one mailing clerk, that operation might be postponed until other and more important work has been done.

Before beginning the work of standardizing the operations in a routine, the routine itself should be thoroughly studied and standardized—that is, the purpose and necessity of each step it involves should be thoroughly known, approved of, and definitely fixed. It should not be assumed that the routine as it stands is satisfactory, for certain operations in it can often

be entirely eliminated, and still more frequently, certain portions of operations can be abandoned.

In the preliminary investigation, the observer should give particular attention to all points where the flow of work is obstructed or interfered with, and endeavor to remove the causes of this condition.

Three Requirements

The setting of standards is comprised in three necessary steps:

1. The existing method must be thoroughly analyzed in order to determine points of strength and of weakness. This study will involve (*a*) the operation, (*b*) the method used, and (*c*) the employee.

2. From the information thus obtained, the observer may possibly be able at once to suggest better methods, and will accordingly devote his attention to the devising of a new method which will retain all the valuable points of the old method and eliminate the weak ones. Usually, however, the devising of new methods is not achieved until after a careful study of the information obtained in step one.

3. Having devised the new methods, it then becomes necessary to set standards of output.

These three steps should be taken in all standardization work, and whether or not it is possible to improve upon the old method, the observer should address himself to the task, for very rarely will an operation be found which cannot be improved upon. It should be remembered, however, that it is not obligatory that the method be changed, for change that is made merely for the sake of change is waste and folly. But, since there is a strong natural tendency to let what is considered "well enough" alone and since this inertia must be overcome before any progress is made, it should be understood that the observer should at least make the effort and make certain that the operation is really well enough to be let alone, instead of merely assuming that it is so. Then again, there are certain types of observers who will constantly suggest changes without having given sufficient consideration to the matter, and, to guard against this, each new method suggested should, before being adopted, be demonstrated by actual test to be better than the old one.

How Standards Are Determined

The setting of standards requires analysis of the points of strength and weakness of the old, and scientific determination of the new, methods.

There are two forms of analysis commonly used: "time" study and "motion" study, and they are so closely linked together that they are often spoken of as "time and motion" study, which gives the erroneous impression that it is a single piece of analytical work.

Time study is the analysis of the times required to perform the units or elements of an operation.

Motion study is an analysis of the motions performed, which is made to determine whether or not the method used is the best that can, at the time, be devised.

Micromotion study is a method of recording the motions made, for future analysis, which at the same time records the times of the units. In this respect it differs from the above—it actually does combine the two studies into a single one.

Motion study usually is made before the making of the time study and the latter may (though not as a rule) be used for the setting of rates on operations independently of motion study and where there has been no alteration in the method.

In the determination of standards, therefore, the order is, first, motion study, for the purpose of discovering opportunities for improvement, and, second, time study, for the purpose of fixing both the method decided upon and the elemental times for doing the work by the approved method.

Motion Study

Though a purely observational analysis, a motion study requires considerable training of a special character. Many operations will appear at first sight to be skillfully and efficiently performed, that afterward will be found considerably below the first estimate. The observer in motion study should also guard against attempting to watch all motions in an operation at one time and should proceed in a definite, systematic manner to observe certain specified things during the process of making the study.

His attention should first be directed to the manner in which the work comes to the operator; whether it comes steadily and regularly, or in unequally sized batches and at irregular times, and, if the latter, how far the flow of work is interfered with in consequence. He must also note whether it comes in such shape that work can be begun immediately on it, or whether any preparatory work is necessary before the operation begins; and if such is the case, whether it is possible to have the work come in a manner in which this will be avoided.

Second, he should study the work place itself. It may not be satisfactory; there may be insufficient room or too much room; the work, the material, and accessories may be placed too high or too low so that the operator has to work in a fatiguing position.

Third, his attention should be directed to the manner in which the work is located in the work place, for very frequently the "layout" is defective and can be greatly improved. Objects which are frequently used in the course of the operation should be placed nearer to the worker than those of less frequent use. There should be a definite place for all tools, such as pencils, pens, erasers, books of reference, and so forth.

Fourth, the study should include observation for apparently superfluous motions, and each such motion should be analyzed to discover whether or not it is really necessary, for all office work is likely to contain many unnecessary motions.

Fifth, the slow motions should be analyzed to determine whether or not there is any necessity for making them slowly, for very frequently slowness is nothing more than a habit; and if the speed of the motion can be increased, the output will be increased correspondingly. Speed is also itself a habit and, once acquired, is no more fatiguing than the slow, leisurely motions.

Sixth, the difficult motions should be studied with a view to their possible simplification.

Seventh, particular attention should be given to those motions which appear to be unskillfully performed. Bungling, skips, stops, fumbles, and other clumsy and awkward motions are not only unnecessary but add to the fatigue and lengthen the time necessary to do the work.

In the making of these observations it is advisable to use a checking sheet, but in any event, the results of each observation should be committed to writing.

It is possible that during the course of the observations, ideas for improvement will occur to the observer. He should make a note of them in passing but should not interrupt his observations to make actual improvements, for it is far more important that the first observations should be made in a systematic manner, and, when this is done, new methods may be devised. It is advisable to have a skilled worker assist in this experimentation, which should be done if possible in a special room provided for the purpose, as the best results cannot be obtained in the main clerical workroom.

When the new method is devised, it should be described in writing, and the description given to an intelligent clerk to discover whether or not it is fully understood. This clerk, to demonstrate his understanding of the description, should be requested to perform the work according to it. Of course, if the change is complicated, it is not likely that the work will be done efficiently, but, if it is done correctly according to the description, it can be assumed that the explanation is sufficiently clear. This procedure is recommended as an important test, for few persons are able to write descriptions of methods so clearly that they will at once be apparent to all who read them, and unless the explanation is understood it is of no value.

Motion study should not be confined to observations on one worker if there are several on the same operation, as it has been demonstrated that elements may be taken from the work of several and combined in one ideal motion cycle. It is also imperative when devising new methods to select only the best workers available for this study.

There is no doubt that in the course of time, when business is more thoroughly standardized, micromotion study will come into universal use, though today few office managers have eliminated even the obvious waste that can be observed with the naked eye.

Time Study

Time study should never be used in an office except for analytical purposes, or the setting of standards. A time study is an analysis of the time required to perform the elements of an operation, the length of time for performing the entire operation not being considered except as the individual studies are com-

How to Prevent These Wastes

First, waste can be prevented by a control over the expenditure of money. The time to exercise that control is when the expenditure is proposed. Afterward, when the approved proposal has become a commitment, may be too late. A carefully prepared budget, properly administered, will help to control unwise expenditures. But even with a budget a definite attitude is essential to the best results. Many people feel that the fact that an item is in the budget is sufficient justification for spending the company's money. Others believe that no more money should be spent than is allowed in the budget. In order that a budget may be flexible, as all budgets should be, some leeway must be provided for necessary adjustments.

A budget furnishes a guide. Properly constructed, it is more than an estimate of income and expenditure for the coming period; it should show what we expect to do and what it will cost to do it. To carry this viewpoint a step further, the responsibility for budget results should be definitely placed on named individuals, so that each individual who is responsible for results knows what his responsibility is and may be held to it.

While a budget is a guide, it is also a means of checking on performance. The budget says we expect to do so-and-so; actually we did thus-and-so. Why? The comparison of budgeted figures with actual results and the seeking of reasons for any differences, are valuable features of budgetary control. They also help in making plans for future action.

The second method of preventing wastes is by a control over the procurement and use of materials, equipment, and services for which money is being spent.

Standard specifications should be provided for all materials and supplies used in the office. These items should be packaged in easily dispensable quantities and their use supervised and checked to prevent waste.

Equipment should be used with care and kept in first-class condition. Dirt and improper operation of a machine will shorten its life measurably; many a new typewriter has been ruined within one month after purchase, because of neglect.

There should be no waste of services. Certain utilities are so handy that it is easy to abuse their very convenience. The

telephone is probably the outstanding example. It may be abused in three ways: personal calls; inefficient use for company business; and unnecessary and extended toll calls. When the toll calls of one company amount to nearly a million dollars a year, the money-saving possibilities are immediately apparent.

Another utility which is abused is the telegraph. One company saved $2,000 a month in its telegraph costs by adapting its requirements to them, by assigning the responsibility of receiving and sending outgoing messages to one person in each branch and in each department, and by instructing them how to cooperate so as to get the desired service at lower cost. The simple editing of telegrams to bring them within the 10-word base has saved many dollars for many concerns.

The waste of electricity is appalling. Lights left burning, fans left running, machine motors not switched off (where not automatic), and so forth—all contribute to unnecessary expense—waste.

The Waste of Human Effort

Finally, there is the enormous waste in human effort. Thousands of office employees are doing unnecessary work. Thousands more are doing necessary work inefficiently. If the principles, methods, and suggestions presented in this book lead to better office management, many of these human wastes will be eliminated. But a conscious effort must be exerted by the office manager. He must abhor waste in any form, visible or invisible, and he must get the habit or state of mind which will constantly measure results against costs. Let him remember that it is important to make savings in good times as well as in bad; that economy waves are undesirable because their advantages do not offset their upsetting effect on the organization; that good management endeavors to eliminate waste wherever it is found, whether in high or low places; and that he must not be satisfied until he eliminates all waste and *keeps it eliminated.*

Possibilities of Permanent Savings

The Research Committee of the National Office Management Association (NOMA) made a comprehensive survey at the beginning of the Second World War to promote the elimination of waste and conservation in the office as a contribution to the war

effort. Excerpts from the report of that survey are presented here not only because of the current value of the suggestions made, but because many, if not all, of these savings, can be made permanent. Attention is called to the statement of the committee that "many of these practices would not be considered practical under normal conditions, but are justified only by the war emergency." One criterion by which to distinguish such an emergency measure from others is the effect it would have on the efficient handling of the office work. For example, the use of the two sides of a letterhead for a letter is obviously an emergency measure, designed to save paper. However, the distraction of continually turning the sheet over in order to grasp what is written on both sides is not conducive to clear thinking; the time lost may offset the saving of paper.

Specific Office Conservation Practices

This section of the report presents a compilation of conservation and waste-elimination practices that have been used effectively by companies included in this survey. They have been grouped under logical headings and constitute a practical check list for use by individual companies. All these practices are not applicable to all companies, of course. It should be remembered, also, that many of these practices would not be considered practical under normal conditions but are justified only by the emergency.

ECONOMY IN PAPER UTILIZATION

1. *Stationery*

   a Use both sides of paper for correspondence extending beyond one page. This applies to both original and copies.

   b Use lighter weight paper for all stationery requirements. A number of companies have reduced letterheads from 20-pound to 16-pound stock.

   c Provide half-size stationery for short letters, memorandums, etc. By running the letterhead across the short dimension rather than the long dimension about 50 per cent more writing surface is secured.

   d Use back of letter being answered for carbon copy of reply. This saves filing space as well as paper and eliminates the need for stapling.

   e Eliminate extra file copies of correspondence. Where two copies had been provided, one for the files of the originating department,

and the other for the general correspondence files, the latter may be dispensed with during the emergency.

f Type or note answer on original letter or memorandum received and return where no file copy of reply is required.

g Minimize the need for formal memorandums for notices of meetings, conferences, etc., by using the telephone.

h Use small printed letterheads instead of multigraphing regular letterheads.

i Use both sides of paper for bulletins, notices, etc., prepared by mimeograph, multigraph, multilith, or similar processes.

j Appraise the need for all duplicated material, and discontinue any not fully justified under present conditions.

k Control closely the number of copies of duplicated material prepared. Eliminate over-runs. Run off in smaller quantities and more frequently to minimize waste.

l Centralize responsibility for approval of all duplicating work with authority to prescribe quantity, size, and quality of paper to be used.

m Use 13-inch mimeograph stencils to reduce multipage work.

n Reduce size of stationery. By reducing its letterheads from 8½ by 11 to 8 by 10 inches and buying mill runs of paper to accommodate the new size, one company saved 13 square inches of paper on each of 7,000,000 sheets.

o Eliminate cover memorandums for transmittal of self-explanatory material. A notation directly on the material may serve in place of a separate routing tab or memorandum.

p Substitute postal cards for letters where practicable. Single and double penny postcards have been substituted for letters, saving paper, carbon, envelopes, and postage.

q Use obsolete or spoiled paper and forms with a blank side for scratch paper, second sheets, rough drafts, etc. Employees can be trained to save much of the material that normally finds its way into the waste basket and to use it for scratch-paper purposes. A folder on each desk is an effective way of assembling this.

r Use smaller size scratch pads and ration more strictly.

s Reuse customer statements by pasting a small patch over the addressographed name and reprinting.

t Eliminate monthly statements of accounts to customers where practicable.

u Adopt the army procedure of endorsements on the original letter rather than writing a separate reply. This has special application to internal correspondence.

v Use narrow-width adding-machine tape wherever possible, double space only when required, break off tapes close to listing, put

supplementary figuring and notations on reverse side of tape rather than using a fresh section, and make sure that rolls are carefully inserted to prevent binding, wrinkling, or tearing.

2. *Envelopes*

a Use lighter weight and smaller size envelopes.
b Standardize on a smaller number of varieties.
c Eliminate envelopes for internal and intercompany mail. Where master envelopes are used, enclosure envelopes should not be necessary. Confidential letters can be folded and stapled or fastened with a small label.
d On intercompany mail leave envelopes unsealed so they may be reused.
e Make maximum use of messenger or chain envelopes. Some companies use these for as many as 50 trips.
f Save incoming envelopes in good condition for reuse. This applies particularly to large kraft envelopes. If opened carefully these will serve many purposes for housing forms, supplies, etc.
g Eliminate return envelopes from advertising mailings.
h Save incoming envelopes, open carefully, and use inside for scratch paper. One company saves all incoming envelopes and sells them as waste paper, the funds going to the Red Cross.
i Eliminate the transparent window covering on window envelopes.
j Consolidate in one envelope all mail for one destination.

3. *Forms*

a Carry out a form reduction and elimination program. Call for a justification of every copy of every form.
b Standardize and simplify on the physical specifications to reduce waste in cutting and minimize varieties.
c Revise existing forms only when vitally necessary.
d Reduce the quantity and increase the frequency of ordering to minimize the danger of obsolescence and deterioration.
e Establish centralized control of all printed forms.
f Make use of combination runs in printing forms.
g Use blank back of obsolete forms for miscellaneous purposes.
h Use both sides of tabulating-run paper.
i Pull ledger sheets for closed accounts and use on back.
j Eliminate cardboard backing wherever possible. Side banding may be substituted on many form printing orders.
k Use one-color printing so far as possible and eliminate colored stocks.
l Minimize use of numbered forms.
m Use mimeograph paper for all office forms.

4. *Filing material*
   - *a* Reuse file folders, index folders, and file guides. Reversing and relabeling often permits such reuse.
   - *b* Salvage filing material released through the weeding of active files for reuse.
   - *c* Survey inactive or dead file to locate material for more active use.
   - *d* Use the backs of 3- by 5-inch index cards.
   - *e* Limit file-folder prongs to thick or unwieldly files only.
   - *f* Reuse storage binders formerly destroyed.
   - *g* Question more strictly as a means of reducing filing requirements, the necessity for filing material.

5. *Waste paper*
   - *a* Provide for systematic collection, baling, and sale of waste paper. Both utilization and price are improved where some method of sorting is employed.
   - *b* Waste paper is shredded and used for packing materials.
   - *c* Save and reuse cardboard and corrugated paper for packing.
   - *d* Use obsolete cardboard signs as backing for forms and scratch pads.
   - *e* Save shipping cartons received for reuse.

6. *General*
   - *a* Paper economy has resulted from the reduction of margins, use of single-space typing, circulating copies of correspondence rather than providing individual copies, encouraging brevity in correspondence and reports, and correcting errors on the original rather than rewriting. One company has prohibited the rewriting of letters and manuscripts except where specifically authorized.
   - *b* All periodic and special reports are surveyed and the need for each one definitely established. Unnecessary reports not only waste paper but also time in their preparation and use. Reports justified under normal conditions may have outlived their usefulness, might be consolidated or modified as to frequency of issue or number of copies, or might be dispensed with entirely as an emergency measure. Routing the original may serve in place of individual copies. The exception method of reporting has economy possibilities.
   - *c* Keep mailing lists and general distribution lists clear of "dead wood."

ECONOMY IN THE USE OF OTHER OFFICE MATERIALS AND SUPPLIES

1. *Typewriter ribbons*
   - *a* Eliminate combination red and black ribbons. Experience shows red section often still good when ribbon is discarded. Infrequent

need for red characters is met in some cases by inserting a piece of red carbon or red ribbon behind the black ribbon. One company using combination ribbons uses the red section for all internal correspondence as a means of equalizing the use.

b Turn one-color ribbons at intervals to ensure full use.

c Alternate with two ribbons week by week to extend their life.

d Wind ribbon completely on one spool before leaving at night.

e Use reinked typewriter ribbons.

f Require empty spool and box to be turned in before new ribbon is issued. Spools and boxes are returned to supplier.

g Keep a card record of ribbons and other supplies issued for each machine.

h Revive old ribbons by winding against a cloth dampened in typewriter oil. An extension of life of 8 weeks was secured by this means in one case.

2. *Pencils*

a Replace wooden pencils with mechanical pencils to secure longer service.

b Reduce the number of varieties and grades of pencils issued.

c Issue new pencils only on the return of stubs.

d Use pencil lengtheners for wooden pencil stubs.

e Use harder grades of lead to increase life.

f Keep pencil sharpeners repaired. Dull and inefficient sharpeners chew up a lot of pencils.

g Salvage the lead from stubs of drawing pencils for use in mechanical pencils.

3. *Carbon paper*

a Salvage one-time carbon for use with teletype and tabulating forms. Some companies use these in lieu of regular carbon paper where only one or two copies are required.

b Prolong the life of carbon paper through care in handling and use. Issue in smaller quantities. Prevent wrinkling and tearing in storage, cabinets and desk drawers.

c Turn carbon paper frequently. By judicious placement and trimming, all space on the carbon can be used.

d Where multiple copies are required put used carbon on first copy and new sheet at the back.

e Provide for central examination of carbon paper before disposal to ensure full utilization.

f Use hectograph in place of typed copies to save carbon paper.

g Substitute carbon-paper ribbons for carbon sheets to secure greater utilization. This has special application to one-time carbons in continuous forms.

h Print instructions for proper handling of carbon paper on the wrapper in which it is issued.

4. *Clips, pins, staples, rubber bands, etc.*

a Remove and reuse all clips, pins, rubber bands, and other fasteners from material before filing, and from all material weeded from files.
b Replace clips and pins with staples. Staples use far less metal.
c Use paper fasteners for metal staples.
d Do not use several rubber bands or staples where one will do.
e Issue supplies more frequently and in smaller quantities to minimize loss and deterioration.
f Ration miscellaneous supplies to control excessive use.
g Salvage obsolete rubber stamps.
h Require the return of worn-out rubber finger tips.
i Use string in place of rubber bands. String-tying machines have been employed in this connection.
j Use paper bands and gummed strips for rubber bands. One company saves the business reply envelopes it receives, opens them and cuts them into strips with a gummed section on each one to use for binding papers.
k Use a sewing machine for fastening papers before filing.
l Save mimeograph stencils and hectograph masters for reruns.
m Use one stencil for two short mimeograph jobs.
n Substitute glue or mucilage for rubber cement.
o Substitute clorox for ink eradicator.
p Launder dust cloths instead of buying new ones.
q Substitute cotton-sheeting mill ends for cheesecloth and wiping cloths.
r Use duplimats instead of aluminum plates on the multilith.
s Save screws and rings of discarded binders.

5. *General*

a Provide for a thorough inventory of all office supplies on hand and arrange for the return of surplus stocks. A 15-minute inventory of desks in one company resulted in finding about a month's supply of paper, obsolete forms, etc. After a similar survey and the institution of a strict system of rationing another company reports that it hopes to make present inventories last for 10 years.
b Institute a periodical follow up for the return of unused and surplus supplies to stores. Some companies provide for this monthly.
c Put more definite restrictions on the issuing of supplies by requiring a written requisition, formal approval of superior, etc. A number of companies have raised the approval level for issuing supplies as a means of tightening control.
d Centralize the distribution of all supplies.

e Substitute new products that economize on critical materials wherever possible.

f Simplify and standardize all office supplies to reduce number of varieties and permit purchasing in larger quantities.

g Provide for frequent checking of waste baskets to locate wasteful practices and economy suggestions.

ECONOMY IN THE USE OF OFFICE MACHINES, FURNITURE AND EQUIPMENT

1. Take an accurate inventory of all machines and equipment to establish location and extent of use.
2. Shift machines and equipment between departments to coincide with needs and to meet requirements for additional equipment.
3. Set up a central pool from which departments borrow to meet peak demands and part-time requirements. This practice is followed quite frequently with typewriters.
4. Centralize operations involving machines to permit greater utilization of equipment.
5. Provide for multiple shifts as a means of utilizing equipment, machines, and facilities more fully.
6. Provide for staggered working hours of departments using the same equipment.
7. Standardize and simplify varieties of office machines, furniture and equipment to provide greater flexibility and facilitate maintenance.
8. Substitute wooden equipment for metal.
9. Revise systems and procedures to eliminate the need for special equipment. One company reported a saving of approximately $10,000 in annual machine rental through a change in its order entry and billing procedure. Another company reported an annual saving of $5,000 in equipment and forms and $3,000 in labor through a change of its sales-analysis procedure from a machine to a manual operation.
10. Adopt a policy of more intensive care and maintenance of existing equipment. A number of companies formerly employing self-service or service on call have changed over to service contracts, sometimes at additional net cost. This is considered justified to permit longer use and reduce service interruptions.
11. Instruct all employees in the proper care and use of furniture, machines, and equipment.
12. Modify standard trade-in or retirement policy to secure longer use. Because of the emergency, equipment is being retained in service even when it becomes a high-cost item from the maintenance standpoint.

13. Rehabilitate old equipment previously retired from service as obsolete or uneconomical.
14. Centralize files and adopt a files-purging system.
15. Inventory all partly used file cabinets and partly filled drawers as a basis for reassignment and reallocation of equipment.
16. Reduce filing-space requirements by a revision of the record retention schedule. One company reported a saving of 6,945 standard filing drawers through this means.
17. Inactive records microfilmed to reduce storage-space requirements.
18. Program for the periodic examination of storage shelves in effect.
19. Repair and repaint old furniture about to be discarded to make usable.
20. Substitute chairs with writing arms for small salesmen's desks.
21. Extension of counters in cashier's office to replace two desks.
22. Cover all office machines before leaving at night. This not only protects the machines from office dust but makes the ribbons last longer.

ECONOMY IN THE USE OF SERVICE FACILITIES

1. Designate monitors to be responsible for extinguishing lights at noon and evening.
2. Place caution cards on light pulls and switches.
3. Distribute special instruction bulletins on methods of economizing in the use of light and power.
4. Conduct an educational campaign to use more daylight—keeping blinds up, lights off.
5. Hold employees responsible for turning off lights when leaving desks or room.
6. Equip desks with fluorescent desk lamps to eliminate large overhead lights where only spot illumination is needed.
7. Paint ceilings and walls a light color.
8. Keep windows and light fixtures clean.
9. Take a daily record of meter reading for comparison purposes.
10. Shut off motors on office machines when not actually operating.
11. Disconnect water coolers at night.
12. Have elevator stop at floor where last passenger leaves and wait for next call rather than returning to ground floor each time.
13. For offices not involved in war work:
    a Give consideration during winter months to getting employees out of the building at an earlier time to save power and coal.
    b Arrange hours of work to utilize greatest amount of daylight.
    c Provide thermostatic control of heating—factory controlled.

14. Reuse, for heating, the steam used to generate power and light during the period from September to May. The chief engineer of one company has installed many devices to control the use of fuel and to secure the maximum energy from the steam generated.
15. Rearrange office to secure maximum use of light.
16. Have janitorial work done during off-peak daylight hours, before the office opens, at noon hour and on Saturdays and Sundays to conserve light.
17. Use reducing nipples on steam radiators to save fuel.
18. Reduce the wattage or size of electric-light bulbs to a minimum and remove unnecessary bulbs.

LABOR ECONOMIES

1. Scheduling of work and consolidation of functions serve to eliminate idle time.
2. Eliminate unnecessary motions in routine operations through time studies.
3. Centralization of work and budgeting of daily work time was estimated to save $3,000 per year by one company.
4. Set standards of a reasonable day's work and measure production.
5. Develop flow-of-work and process charts by a planning department to eliminate backtracking and superfluous operations.
6. Develop a flexible staff that can be shifted to meet peak loads.
7. A general increase in working hours and salaries was advocated to meet increased volume of work without additional personnel and thus make more workers available for war industries.
8. Careful job analysis and redefinition of jobs to permit use of less skilled employees.
9. Closer supervision of time spent out of the department and the use of matrons in women's rest rooms to discourage loafing.
10. Use of salesmen for office work when not on the road.
11. Provide additional time clocks to avoid congestion and delay in both entering and leaving the office.
12. Provide safe and healthful working conditions to minimize lost time due to sickness and accidents.
13. Require justification and prior approval for all overtime.
14. Many of the economical practices listed in the preceding sections carry with them corresponding labor economies, *e.g.*:
    a Reduction in the number of sheets of duplicated material reduces the labor of collating, stapling, punching, trimming, wrapping, stocking, etc.
    b Notation of replies to correspondence in the form of longhand memorandum or footnote conserves the time of typists and file clerks.

c Making minor corrections and editorial changes on manuscripts and correspondence by hand saves the time of stenographers and typists.

d Eliminating or reducing the number of reports and forms saves time in both the preparation and subsequent handling.

e Photostating records in place of typing is a time saver.

SAVINGS ACCOMPLISHED

There is no accurate basis for estimating the total savings that these economies have produced. Actually, of course, many of these practices were inaugurated with the primary purpose of conserving irreplaceable materials and equipment rather than producing dollar savings. Practically, however, top management tends to appraise such efforts on a monetary basis and some such measurement of accomplishments would probably be helpful in securing executive interest and support.

Several companies reported savings of from 10 to 25 per cent in the consumption of paper. One company reported a saving of 2,000 pounds of paper and another of 50,000 pounds of paper per year. One company saved 9,000 pounds of paper on public-utility bills alone. Another saved approximately 250,000 letter-size sheets of paper due mainly to consolidation and elimination of printed forms. One company estimated savings of over a million sheets of 8½- by 11-inch paper annually and another saved 916,000 copies per year as a result of a reduction in forms prepared and copies distributed.

In the field of office supplies savings of 40 per cent in typewriter ribbons, 20 per cent in carbon paper and 10 per cent in pencils were reported.

One company stated that through standardization and simplification of procedures it was saving 1,700 man-hours per week.

Evidence that some of the economies resulting from a waste-elimination campaign are measurable is furnished by the following citation of reductions accomplished in one office organization during the month of January.

Telephone reduction in number of calls—8,000
representing savings of $400 or 25 per cent
Stockroom withdrawals showed savings of $1,200 or 20 per cent
Messenger service—reduction in number of calls 2,210 or 20 per cent

Factual material along these lines should prove highly effective in selling the value of a waste-elimination program.

CONCLUSION

The results of this survey permit certain definite conclusions. These are summarized as follows:

1. A program of conservation and waste elimination in the office provides an excellent opportunity for office organizations (both executive and rank and file) to take an active part. It is doubtful if there is any other single activity that would be more helpful.
2. A successful program calls for a carefully planned campaign on a continuing basis—not just sporadic efforts.
3. Some form of cooperative approach seems indicated that will tie in rank-and-file employees and make them feel that it is just as much their problem as the management's. Encourage suggestions from employees.
4. Making employees "waste conscious" and getting them to actually carry out waste-elimination practices is largely a matter of education, supervision, and repetition. The establishment of and adherence to standards facilitated enforcement.
5. Responsibility for administering the program and getting action needs to be clearly defined and specifically assigned. If a committee setup is employed give that committee power to act. The designation of some one individual to push the program seems to have proved most satisfactory.
6. The active interest and wholehearted backing of top management is necessary for the plan to be successful. A lukewarm or disinterested attitude on their part will quickly be reflected in the rank and file.
7. Employee enthusiasm and participation can be developed through the usual promotional and publicity devices such as bulletins, posters, house organ articles, etc., but new and unique methods of stirring up interest are proving especially effective.
8. Most programs are based largely on the dissemination of specific conservation and waste-elimination practices. Usually some logical approach is employed in developing these. In one instance the practices are classified under: (*a*) conservation, (*b*) simplification, (*c*) substitution, and (*d*) salvage. Another approach employed is (*a*) do not use—or stop using, (*b*) use less than formerly, (*c*) use more effectively than formerly, (*d*) use over again, and (*e*) salvage.
9. There is need for more effective means of follow up and enforcement of waste-elimination practices. This seems to be a common weakness of the programs so far developed. Conservation practices no matter how excellent in themselves accomplish nothing unless they are carried out.
10. So far as practicable, special efforts should be made to measure the results of the program in terms of actual reductions, savings, etc. This provides useful material for promoting the program with top management and others as well as an indication of comparative performance. However, many executives believe that the major dividends received from their program is the development of a

general waste-conscious attitude on the part of the employees rather than the actual reductions accomplished.

Questions for Discussion

1. "The office is really a money maker and a money saver." Explain.
2. "The sin of American business is waste." Comment.
3. Why is an "economy wave" undesirable?
4. Into what three classes may waste be divided?
5. How may the waste of money be prevented?
6. Is the fact that an item is in the budget a sufficient justification for spending the company's money? Why or why not?
7. What should a budget do?
8. How may the waste of materials, equipment, and services be prevented?
9. Comment on the waste of human effort.
10. Under what five heads are the survey findings of the National Office Management Association Research Committee grouped?
11. Name two items under each of the five headings and comment on them.

INDEX

A

Accessories, desk, 188
Accuracy, habit of, 72
Acoustical treatment, 252–253
Adding machines, 200
Addressing machines, 205–206
Administration, 38–39
  definition of, 38
  function of, 39
Aisles, width of, 271
Allowances for delay, 405–406, 425–426
American Hospital Association, 254
Analysis, of card indexes, 141
  charts for, 64–68
  of desk systems, 187–189
  of existing method, 397
  in experiments, 360–369
    (*See also* Experiments, scientific)
  experts, use of, in, 369–370
  of flow of work, 261–262
  of job, 283–287
  major steps in, 357–360
  organizing work of, 369–370
  by planning department, 416–417
  of positions, 345–349
  principle of, 28
  of records, 129
  requirements of, 357
  results from, 370
  of sales, 14
  scientific, 357–370
    (*See also* Scientific analysis)
Apparatus for experiments, 365–366
Appliances, repair of, 292–293
    (*See also* Equipment; Machinery, office)
Applicants for employment, interviewing, 316–317
Applicants for employment, references of, 318–319
  testing, 296–313
    (*See also* Tests and testing)
Application forms, 317
Arrangement of office, 258–272
  analyzing the flow of work, 261
  appearance of, 258, 265
  clerks on feet test of, 260
  expansion, allowing for, in, 270
  flow, analyzing (*see* Flow of work)
  location of departments, 262–264
  making the new layout, 271–272
  mapping flow of work in, 269–270
  planning of, 266–272
  psychological effects of, 258–259
  relation of workers with each other, 264–265
  rules for spacing desks, 271–272
  selling the new plan, 272
  space allowances, 271–272
    (*See also* Space, office)
  standard symbols used in plan of, 268
  straight-line flow in, 259–262
    (*See also* Straight-line flow)
  telephone and buzzer conduits, 227
  templets, use of, in, 270–272
  toilet facilities, 255–256
  uniformity desirable in, 265–266
  who should plan, 266
Arrangement of stock, 166, 169–170
Artificial lighting, 242–244
    (*See also* Lighting)
Assignment of work, 417–418, 422
Assignment record, 287–288
Attitude of executives, 22
Authority, charting of, 43
  clearly defined, 41
  delegation of, 41
Automatic pencils, 173

B

Barnum, C. L., 145
Belt conveyors, 90
Billing machines, 214
Blue-print duplication, 197
(*See also* Duplicating processes)
Bond papers, 147–148
Bonuses, 339–344
calculated by planning department, 419
for calculating work, 218
effect of, on unit costs, 342
graduated plan of, 341–342
group measurement for, 387, 395
how to figure, 341–344, 387
Leffingwell plan for, 341–344
(*See also* Incentives; Standardization; Standards)
for section heads, 344
Bookkeeping machines, 201–203, 215
duties of operator of, 346
Boston Chamber of Commerce, 347
Bottlenecks, chart showing, 68–69
Bristol, index, 148
Buck passing, elimination of, 41
Budget, 433
Building, office, 222–235
lighting, 227, 238–239
(*See also* Lighting)
location of, 222–223, 225–226)
ventilation of, 226
Business, relation of office to, 1
Buzzer conduits, 227

C

Calculating, tables for, use of, 216
Calculating machines, 201, 213–220
analyzing need for, 213–216
central computing section, 25, 218–220
duties of operator of, 346
getting a large output from, 217–218
bonuses for, 218
organizing work of, 217–220
slide rule, 216–217
Calculating machines, training in use of, 217–218
where used, 214–216
Calendar, on desk, 186
of duties, 287
Call systems for executives, 91–92
Callers, reception of, 291–292
Capacity, of individuals, 45–46
of machines, 45
theoretical, 79
Carbon paper, duplication by, 197
(*See also* Duplicating processes)
economy in use of, 439–440
selection of, 173
testing of, 362–363
Card indexing, operations in, 138–140
visible, 138–141
Carnegie Foundation for Advancement of Teaching, 393*n*.
Carriers, mechanical, 90
Cash mail, 97, 98
Catalogue files, 138
Causes of delays, 80–81
Census, Bureau of, 203
Center, Charles I., 181
Central computing section, 25, 218–220
Central departments, location of, 262–264
Central duplicating section, 25
Central filing section, 25, 132–133
Central planning room, 416–420
(*See also* Planning)
Central stenographic section, 24, 420
Central stockkeeping, 25
(*See also* Stationery and supplies)
Centralized control, advantages of, 23–26
results of lack of, 21–22
Chairs, 180–184
faults of, 183–184
Leffingwell correct posture, 183
posture, 183
Changes in forms, providing for, 161

Charts, cross-analysis, 66–67
flow, 64–68
form, 65
functional, 43
isometric flow, 65–66
neck, 68–69
organization, 42–44
steps-in-squares, 65
Check files, 138
Checking, unnecessary, avoiding, 71
Civil Service Commission, U.S., 347
Classification, decimal system of, 156
of data, 418
of jobs, 345
of records, 131
of stock, 166–168
Cleaning, 292
Clerical activities, 1–3
fundamental tasks in, 3
linking function of, 3
manager of, 16
unit for measuring, 380
Clerical minutes per order, 378
Clerk, desk system for, 190–192
Clips, brass, 172, 440
Cloakrooms, 228
Clocks and clock watching, 256
Cody, Sherwin, 301*n*.
Coefficients of sound absorption, 253
Colors, in forms, 150
light absorption by, 249–250
Committee on Simplification of Paper Sizes, 148
Communication, 2
interoffice, 113
(*See also* Intercommunication; Mail and messenger service)
Compensation of employees, 337–354
bonus, figuring, 341–344, 387
General Foods Job Rating Scale, 350–351
general situation as to, 337–338
initial, problem of, 337
job descriptions, for specific jobs, 345–348
standard, 345–349
Compensation of employees, job descriptions, use of terms in, 348–349
Leffingwell bonus plan, 341–344
as a reward for effort, 338–344
problem of, 338–340
profit sharing, 339
requirements of a reward, 340–341
salaries, determining, 349–353
discrepancies in, 344
establishing limits of, 352–353
increases in, 352–353
standardization of, 344–354
starting, 353
salary standardization, 344–354
advantages of, 354
objective of, 344
scale, job rating, 350–351
section head, reward for, 344
setting standards of, 343–344
standardization of work necessary, 342–343, 345
Composition of letters, test of, 302
Computing, 2
machines for, 200–205, 213–220
section for, central, 25, 218–220
Conditions, working (*see* Heating; Lighting; Noise; Ventilation)
Conduits for wires, 227, 265
Conservation, office, 435–436
(*See also* Economy; Expense, office; Waste)
Consultants, use of, 369–370
Continuous transfer, 134
Control, 3, 21–22, 23–26, 42, 44–54
centralized, 23–26
of conditions, 49
conditions necessary to, 50–53
definition of, 44
elements of, 45
figures of output for, 388–389
of filing work, 136
five kinds of work under, 53–54
functional, 23
of human element, 46–48
of incoming mail, 99

Control, through measurement, 373–389
(*See also* Measurement)
of office machinery, 45–46
of office work, 3
planning and scheduling (*see* Planning; Scheduling)
psychological factors of, 47–48
results of lack of, 21–22
scientific, 50–53
span of, 42
standardization necessary to, 50
of stationery inventory, 175
(*See also* Economy; Stationery and supplies)
of stenographers, 106
of waste (*see* Economy; Waste)
when present, 48
Convertible desks, 181–182
Conveyors, belt, 260
pneumatic tubes, 90
Cooke, Morris L., 392
Cooperation, 33–34
Copies, making of, 11
(*See also* Duplicating processes)
Copley, Frank B., 361
Copy reading, training in, 329–330
Correspondence, 104–117
analysis of, 107
building good will by, 108–109
chief purposes of, 115–116
courtesy in, 116
dictation of, to machines, 207, 208
external, 104–113
form paragraphs, advantages of, 111–112
construction of, 112–113
improving quality of, 109–110
instructions on, 115
internal, 104, 113–115
excess, causes of, 113–114
memorandum for, 114
standardized messages in, 114–115
letter-writing routine, 105–106
manual (*see* Standard practice instructions)
nonroutine dictation. 106–107
Correspondence, preplanning work in, 419
routine of letter writing, 105–106
rules for, general, 116–117
brevity, 116–117
clarity, 116
courtesy, 116
expressions to avoid, 117
standard paragraphs, 110–113
advantages of, 111–112
construction of, 112–113
standard practice instructions, 115
standardizing company policies on, 108–109
methods of, 109–113
style, 110–112, 117
stationery for, economy in use of, 435–437
and transcribing, 104–122
useless, eliminating, 117
Cost, of planning, 427–428
of supplies, 164–165
of training, 331–332
of work, keeping down, 431–446
(*See also* Economy; Expense, office)
measurement of, 379–380
Cost records, 130
Counting work, 383–385
Courtesy in correspondence, 116
Credit department, location of, 263
Cross-analysis chart, 66–67
Current-practice instructions, 44, 289, 322
Cycle of motions, 402
Cylinders for dictation, providing, 106

D

Data needed in scheduling, 424, 425
Daylight, in buildings, 238–239
intensity of, 243
penetration of, 239
saw-tooth roofs, 239
variations in, 242, 243
Deadening noise, 252–253

Decimal system, 156
Decisions, making, 72, 330
Delays, allowances for, 405–406
causes of, 80–81
Delegation of responsibility, 52
Department-head type of worker, 282–283
Department heads and the office manager, 23
Departmental records of progress, 388
Departments, location of, 262–264
Description, occupational, 285–286
Descriptions, job, standard, 345–349
Design, of forms, 144–162
(*See also* Forms)
of records, 127–128
simplicity of, 153
Desk, accessories for, 186–187
convertible, 181–182
cost of, 179–180
directory of, 188–189
drawers of, 186
factors involved, 178–180
height of, 182
inspection of, 189
interchangeability of, 180–182
lighting of, 245
preliminary study of, 181
problem, factors of, 178–180
purpose of, 178
secretarial, 191–192
size of, 178–179
space allowances for, 271–272
standardization of, 180–182
storage space in, 179
Studebaker, 181–182
study of, 181
telephone on, 186
tickler system for, 186
tools used with, 187–188
trays for, 186
various uses of, 180
work organizer for, 187
as work place, 180, 185–186
Desk systems, 184–190
analysis of the problem of, 187–189
Desk systems, for clerks, 185
data needed in, 188
for executives, 189–190
for file clerks, 192
inspection of, 189
need of, 184
no universal, 184–185
for secretaries, 191–192
for stenographers, 191
supplies used in, 188, 190
tickler, 186
tools used in, 187–188
for typists, 191
work organizer, 187
Destruction of records, 135
Diagrams, flow, 64–68
Dictating machines, 92, 106, 207–208
Dictation, nonroutine, 106–107
providing cylinders for, 106
routine, 105–106
scheduling, 107
speed of, in tests for stenographers, 303
Dictionary of Occupational Titles, 347
Direct duplication, 199
(*See also* Duplicating processes)
Direct lighting, 246
(*See also* Lighting)
Directory, desk, 188–189
Discharge, 315
Dispatch routines, 59
Dissatisfaction, determining causes of, 324–325
Division of labor, 32–33
Dominant routine, 261
Double-printing process for ruled forms, 158
Drinking fountains, 255
Drop lights, disadvantages of, 245
Duplicating, choosing the method of, 199–200
Duplicating processes, 197–200
blue print, 197
carbon, 197
direct process, 199
economical use of, 436
gelatin, or hectograph, 198–199

Duplicating processes, liquid, 199
lithoprint, 197–198
photolithography, 198
selection of, 199–200
spirit, 199
stencil, 198
type and ribbon, 198
Duplicating section, 25
Duplication of work, 70
Duties, of planning department, 416–419
record of, 287–289
as shown by standard job descriptions, 285–286, 345–349

E

Economy, labor, 443–444
in paper utilization, 435–438
envelopes, 437
filing material, 438
forms, 437
general, 438
stationery, 435–437
waste paper, 438
savings from, 444
summary conclusions concerning, 444–446
in use of office machines, furniture, and equipment, 441–442
in use of office materials and supplies, 438
carbon paper, 439–440
clips, pins, rubber bands, 440
general, 440–441
pencils, 439
typewriter ribbons, 438–439
in use of service facilities, 442–443
Efficiency, desk systems and, 184
finding rate of, 380–381
Elements, of planning, 412
standard, 402, 408
Elevators, 90
Employee's progress record, 319–320
Employment, 315–327
application blank for, 317
of beginners, 316
Employment, discharge, 315
dissatisfaction, detecting, 324–326
of executives, 319
experience, value of in, 315–316
of experienced clerks, 315–316
finding the right person, 31
follow-up in, 322–323
interviewing applicants for, 316–317
introducing the new employee, 320–322
job specification, 306, 316, 318
office manual, contents of, 322
qualification card, 319–320
quits, reasons for, 323–324
reception of new employees, 320–322
references, value of, 318–319
salary standards, 326
trial-and-error method of, 296–297
turnover in, 326–327
waiting room, 316
who should employ, 315
Envelope addressing, training in, 329–330
Envelopes, 437
Equipment, economy in use of, 441–442
filing, 136–141
requirements of, 137
symbols for, 268
(*See also* Desks; Machinery, office)
templets for, 270–272
Erasures, 118
Errors in experiments, eliminating, 368–369
in typewriting, causes of, 121–122
Estimating work ahead, 53
Executive, definition of, 189
desk system for, 189–190
Executive type of worker, 282
Executives, attitude of, 22
location of, 264
Expansion, how to figure, 270
provision for, 223–225
Expense of office, 431–446
budget in controlling, 433

Expense of office, economies possible, 435–446
(*See also* Economy)
economy wave, 431
possible permanent savings, 434–446
unnecessary, due to waste, 431–434
(*See also* Waste)
as "unproductive," 4, 431
Experiments, scientific (*see* Scientific experiments)
Experts, outside, use of, 369–370
External correspondence, 104–113

F

Facilitating services (*see* Office service)
Fact finding, 28–30
Fair Labor Standards Act, minimum wage set by, 342
Fatigue, 406–407
Figures for control, 388–389
File clerks, desk equipment for, 192
duties of, 345–346
File drawer, testing, 364–365
Filing, 131–141
central, 25, 132–133
items to omit in, 133
control of, 136
in desk drawers, 133
destroying old records, 135
equipment for, 136–141
cabinets, 137–138, 140
requirements of, 137
shelves for, 138
wheels, 141
follow-up, 135
as a form of record keeping, 131
function of, 131–132
inspection of, 136
material for, economical use of, 438
requirements of, 131–132
testing ability for, 304, 310–311
ticklers, 135
transferring, 134–135
Filing, vertical vs. horizontal, 136–137
visible, 138–141
waste in, 20
Filing department, location of, 264
Fill-in work, 50
Financial incentives, 338–344
Floor covering, 253–254
types recommended, 254
Floor space (*see* Space, office)
Flow of work, 71, 76–81, 259–262, 269–270
analysis of, 261–262
capacity, theoretical, 79
charts showing, 64–68
defects in, causes of, 77–78, 80–81
departmental lines of, 262
difficulties encountered in, 79–81
explanation of, 76–77
impediments in, 77–78
lines of, departmental, 262
a management problem, 77–78
mapping the, 269–270
progressive assembly plan of, 78
scheduling the, 424
straight-line, 259–262
testing the, 260
theoretical capacity, 79
unit plan of, 78–79
Fluorescent lighting, 244
Flying squadron, 50, 333, 419
Folding machine, 206
Follow-up, of new employees, 322–323
of schedules, 426–427
in mail-order houses, 427
Follow-up file, 135
Foot-candle, 240–241
Foot-candle meter, 248
Form chart, 65
Form paragraphs, 110–113
advantages of, 111–112
construction of, 112–113
Forms, 144–162
arrangement of, 154
faulty, 155
changes in, providing for, 161
colors, use of, in, 150

Forms, column widths and lengths in, 160–161
cost of, 144
design of, 153–161
as to arrangement of information, 154–155
as to make-up, 154
as to name and number, 156
as to ruled lines, 156–158
as to simplicity, 153
as to size, 153, 161
as to use, 145, 153–154
faulty arrangement in, 155
special considerations in, 154
special procedure in, 158–161
double printing of lines in, 158
economy in use of, 437
(*See also* Economy)
make-up of, 154
naming and numbering of, 156
obsolete, use of, 175
packing, standardization of, 152–153
paper for, 145–149
(*See also* Paper)
perforating, 151
punching of, 150–151
purpose of, 145
quantity to order, 151–152
rules lines in, 156–158
savings possible in, 144
scoring of, 151
sizes of, 149, 153, 161
specifications for, 157
standardizing, factors in, 145–149
type for, 149–150
use of, 145, 153–154
used in planning, 420–422
Fountain pens, 173
Fountains, drinking, 255
Franklin, Benjamin, 431
Function, importance of, 39
of management, 39
of office management, 1, 2, 23, 40
study of, 52
Functional control, 23
Functional foreman, 23
Functional thinking, 39
Functionalization, 42
Furniture (*see* Desk; Economy; Equipment)

G

Gelatin duplication, 198–199
(*See also* Duplicating processes)
General Foods job-rating scale, 349, 350–351
Glare, 239, 244–245
Glue, 174
Good will, opportunities for building, 108–109
Gothic type, for forms, 149–150
Grading of tests, 299
Grammar, testing of, 297, 300
Graphic routine charts, 64–68
Groups, measurement by, 387, 395
Guide, standard practice, 407–408

H

Habits, of accuracy, 72
formation of, 392
order of development of, 72
of speed, 72, 330
of work, 71, 392–393
Health of clerks, 47
Heating, 250–251
automatic regulation of, 251
ideal temperature of, 250
overheating, 251
of private offices, 230
Hectograph duplication, 198–199
(*See also* Duplicating processes)
Hiring (*see* Employment)
Hollerith, Dr. Herman, 203
House mail service, 84, 87–90
Human element, control of, 46–48
Hunches, in management, 373

I

Idle time, 21, 24
Illumination (*see* Lighting)
Illuminometer, 248
In-and-out trays, 186

Incentives, financial, 338–344
Leffingwell bonus plan of, 341–344
nonfinancial, 338
rewarding section head, 344
size of reward, 340
Index bristols, 148
Indexes, visible, 138–141
Indicia, for postage, 207
Indirect lighting, 246
(*See also* Lighting)
Individual differences, 277–280
Individual output, measurement of, 388, 395
Individual planning, 412, 415
Information, general, test of, 302
Ink, 174
Inspection of files, 136
Instruction on the job, 328–331
(*See also* Training)
Instructions, standard practice, 115, 289, 322, 328
Instructor, qualifications of, 332–333
Intelligence, testing of, 297
of executives, 319
Intensity of lighting, 241–244, 247
(*See also* Lighting)
Interchangeability of desks, 180–182
Intercommunication, 83–100
analyzing the problem of, 93
ascertaining requirements of, 94
automatic telephone, 91
figuring cost of, 94
forms of, 86
loud-speaking telephones, 91
pneumatic tube, 90
problems of, 84–87, 93–94
signaling devices, 91
telautograph, 90
telephone, 91
teletypewriter, 90
when needed, 84–85
(*See also* Messenger service)
Interdepartmental communication, 114
Interior decoration, 249–250
Internal correspondence, 104, 113–115
Internal mail service, 84, 87–90
Interviewing applicants, 316–317
purposes of, 115–116
Introduction of new employees, 320–322
Inventory, control of, 175
perpetual, 175
Investigator type of worker, 282
Invoices, filing of, 137
Isometric flow chart, 65–66
Issuing of stock, 166, 168, 171–172

J

Janitorial work, 292
Job analysis, 283–287
distinction between job and occupation, 283
finding capacities required, 283
getting the facts, 284–285
motion study, 398–400
(*See also* Standardization; Standards)
occupational description, 285–286
time study, 400–406
(*See also* Standardization; Standards)
Job descriptions, standard, 345–349
Job specifications, 285–286, 306, 316, 318
Joint Committee on Tests, 307*n*.

K

Key punch operator, duties of, 346
Key-stroke method of measurement, 384

L

Labor turnover records, 131
Laying out work, training in, 329
Layout (*see* Arrangement)
Ledger papers, 147
Leffingwell bonus plan, 341–344
Leffingwell posture chair, 183
Leffingwell square-inch scale, 385
Letter writing, 104–109
test of, 302
Light, absorption of, 249–250
measurement of, 248–249

Lighting, 227, 238–250
artificial, factors of, 242–244
colors of walls and ceiling, 249–250
daylight in, intensity of, 243
penetration of, 239
desk and drop lights, 245
deteriorating factors in, 247–248
direct, 246
economy in use of, 442–443
effect of, on location, 265
fluorescent, 244
foot-candle, definition of, 240
meter, 248
requirements, 247
glare, 239, 244–245
importance of, 234–235
progress of, 240, 247
semi-indirect, 246
standards recommended for, 246–247
systems of, 245–246
Limits for salaries, 352–353
Lines, ruled, in forms, 156–158
Linoleum, for floors, 254
Liquid duplicator, 199
(*See also* Duplicating processes)
Listing machine, 200
Lithoprint duplicator, 197
(*See also* Duplicating processes)
Location, of departments, 262–264
factors in the problem, 225–226
of office building, 222–223
of stockroom, 166, 168
Lumen, 240–241

M

Macbeth Illuminometers, 248
Machinery, office, 194–211
for adding and calculating, 200, 201, 213–220
calculating, 201
computing, 200
listing, 200
nonlisting, 200
for addressing, 205–206
analyzing requirements in, 195–196
for billing, 214
Machinery, office, for bookkeeping, 201–203, 215
control of, 45–46
determining what to buy, 195
for dictating, 207–208
for duplicating, 197–200
blue print, 197
carbon, 197
choice of methods, 199–200
direct process, 199
gelatin, or hectograph, 198–199
lithoprint, 197–198
photocopying, 197
photolithography, 198
spirit, 199
stencil, 198
type and ribbon, 198
for folding, 206
idle, expense of, 195
location of, 265
for mailing, 206
for posting, 201–203, 215
to promote accuracy, 195
for recording conferences, 207–208
for recording telephone conversations, 207–208
to relieve drudgery, 195
to save time, 194–195
for sorting, 191, 209, 215
for stamp affixing, 206
for statistical work, 203–205, 215
trend of, 14
when to use, 194–195
Mail and messenger service, 83–100
cash mail, 97, 98
control of, 99
distributing the first mail, 98–99
intercommunication, problems of, 84–87
analyzing the problem of, 93–94
forms of, 86
mechanical devices for, 90–93
limitations of, 92–93
messenger service, 87–90
oral, 91–92

Mail and messenger service, intercommunication, when needed, 84–85
internal mail service, 84–90
metered mail, 207
obtaining previous correspondence, 98
opening the mail, 94–97
desk system for, 191
importance of early handling, 95
presorting, 96
removing contents, 96–97
standard method of, 95, 97
tables for, 191
outgoing mail, 99–100
machines used for, 206
reading the mail, 97–98
time stamping, 97
Mailing department lines of flow, 262
Mail-opening clerk, analysis of work of, 285–286
Mail-order houses, measurement by, 383
scheduling by, 427
Maintenance, of lighting system, 247–248
standardizing, 292
Management, control in, 45
(*See also* Control)
responsibility of, for assignments, 41
science in, 15
(*See also* Office management)
Management, function of, 39
meaning of, 39–40
scientific, 26–34
Manual, office, content of, 321
Mapping flow of work, 269–270
Master planning, 413–414
(*See also* Planning)
Mastic, for floors, 254
Measurement, 373–389
approximate, value of, 385–386
of certain features, 379
clerical minutes per order, 378, 388
control figures from 388–389
of cost, 379–380
Measurement, by counting, 383–384
different methods of, 383–385
difficulties of, 373–375, 386
by groups, 387, 395
importance of, 373–375
of individual output, 388, 395
by keystrokes, 384
of light, 248
by mail-order houses, 383
necessity of, 375
objections to, 374–375, 386
purposes of, 373
recording for, 387–389
of repetitive work, 383
by scales, 384–385
by square-inch method, 385
and standization, 394–395
by time taken, 381, 382, 386
of typewritten matter, 384–385
unit of, 375–381
for clerical output, 380
definition of, 380
need for, 375–376
order as, 377–379, 389
other items as, 379
for over-all measurement, 377
requirements of, 376–377
work, 380–382
ways of, 383–385
when to do, 386
where to start, 383
work not subject to, 374, 383
Mechanical devices, in intercommunication, 90–93
limitations of, 92–93
(*See also* Machinery, office)
Memorandum for internal correspondence, 114
Merrick, Dwight V., 340, 406
Messenger, duties of, 345
Messenger service, 83–100
facilities to provide for, 88–89
instructions, 89
mechanical aids to, 92
planning and organizing, 87–90
primitive forms of, 87
and straight-line flow, 260

Metal-cutting experiment, Taylor's, 360–361
Metered mail, 207
Method, questions of, 41
scientific, 26–34
Microfilm, 209
Micromotion study, 398, 400
Mimeograph, paper for, 147
Minutes per order, 378
Morning mail, handling, 94–99
(*See also* Mail and messenger service)
Motion study, 398–400
(*See also* Standardization; Standards)
Motions, cycle of, 402
six standard elements in, 402
using correct, 329
Mucilage, 174

N

National Association of Employing Lithographers, 148
National Clerical Ability Tests, 299, 307–313
(*See also* Tests and testing)
National Council of Business Education, 307, 312
National Office Management Association, 307, 312, 345, 434
Neck chart, 68–69
New York State Committee on Ventilation, 251
Noise, 47, 252–253
Nomenclature, standard, 44
Nonfinancial incentives, 338
Nonlisting machines, 200
Nonmetered mail, 207
Nonroutine job, analysis of, 286–287
appliance repairman, 292–293
janitor, 292
reception clerk, 291–292
standardization of, 287–289
telephone operator, 290–291
Nonroutine work, planning of, 419
scheduling of, 426

O

Objective, definition of, 358
Observations, causes of variations in, 368
making of, 359–360
recording, 366–367
(*See also* Experiments, scientific)
Obsolete material, 175
Occupational description, 285–286
Occupational tests (*see* Tests and testing)
Occupational Titles, Dictionary of, 347
Office, 1
intercommunication in, 83–100
layout (*see* Arrangement, office)
linking activity of, 3, 9
purpose of, 3
relation of to general business, 1–16
routines of, 58–73
(*See also* Routines)
size of, to need office manager, 26
subdivisions of, 51
trend in, 9–16
Office buildings, lighting and ventilation of, 226–227
location of, 222–223, 225–226
Office expense (*see* Expense, office)
Office lighting (*see* Lighting)
Office location, 222–227
Office machines, control of, 45–46
(*See also* Machinery, office)
Office management, control in, 44–54
(*See also* Control)
function of, 1, 2, 23, 40, 277
modern conception of, 20
present trend of, 9–15
scientific, principles of, 26–34
a specialty, 3, 8–9
Office manager, and department heads, 23
functional, 23
requirements of, 8–9, 15
size of office having, 26
status of, 22

Office manager, title of, 16
when needed, 26
Office manual, content and use of, 321
Office organization, typical, 7
Office records, 125–131
Office personnel, control of, 46–48
(*See also* Control)
health of, 47
and the scientific method, 34
training of, 31–32
treatment of, 47–48
(*See also* Personnel)
Office service, 83–100
centralization of, 83
correspondence and transcribing (*see* Correspondence; Typewriting transcription)
effect on office work, 83
filing (*see* Filing)
inadequate, results of, 83
mail and messenger (*see* Mail and messenger service)
stockkeeping (*see* Stationery and supplies)
Office supplies (*see* Stationery and supplies)
Office work, 1, 2
characteristics of, 48–49
control of, 3
(*See also* Control)
controllable, 3
division of labor in, 32–33
eliminating superfluous, 11
fundamental tasks in, 3
measurable, 53
(*See also* Measurement)
periodical, 54
primary functions of, 1–3
product of, 5–7
productivity of, 4, 9, 22
routines of, 58–73
(*See also* Routines)
types of, 3, 49
Office workers (*see* Personnel)
Operation, standardized, 380
Operation charts, 64–68
Operations, analysis of, 61–64
in card indexing, 138–140
possible to standardize, 394–397
Order as unit of measurement, 377
Order routine, chart of, 65
(*See also* Routines)
Organization, 33, 40–44
of central files, 132–133
chart of, how made, 42–44
definition of, 40–41
functionalization and specialization, 42
of planning, 412, 415
(*See also* Planning)
questions of, 41
rules of, 41–42
assigning responsibility, 41
delegating authority, 41–42
span of control, 42
of scientific analysis, 369–370
write-up of, 44
Outgoing mail, 99–100
Overtime, 46

P

Paper, carbon, 173, 362–363, 439–440
economy in use of, 435–438
for forms, 145–149
appearance of, 146
colors in, 150
impress of, 146, 147
longevity of, 145–146
scoring of, 151
standard sizes of, 149, 161
strength of, 147
treatment of, 146, 147
type faces for, 149–150
(*See also* Forms)
Paragraphs, standard, 110–113
advantages of, 111–112
construction of, 112–113
Paste, 174
Peak loads, 24
handling of, 50, 333
Pegboard, 209

Pen ruling, 156–158
Pencils, 172–173, 439
Periodic transfer, 134
Periodical work, 54
Personnel, analyzing the job, 283–287
  applicants, testing of, 296–313 (*See also* Tests and testing)
  bonuses for (*see* Bonuses)
  compensation of, 337–354 (*See also* Compensation of employees)
  differences between individuals, 277–280
  employee testing, 296–313 (*See also* Tests and testing)
  employment, 315–327 (*See also* Employment)
  environmental influences on, 278
  function of management as to, 277
  hereditary influences on, 278
  how men differ, 277–280
  interests of, 280–281
  job analysis, 283–287
  job specifications, 306, 316, 318
  mental capacities of, 279–280
  nonroutine jobs, 286–293
  occupational description, 285–286
  opportunities of, 281
  payment of (*see* Compensation of employees)
  physical capacities of, 278–279
  place of, in organization, 277
  of planning department, 427
  records of, 130–131
  scientific management and, 276
  standardization of, 276–277
  training of, 31, 327–334 (*See also* Training)
  turnover of, 297, 326–327
  types of, 281–283
Personnel Classification Board, 347
Phonograph (*see* Dictating machines)
Photocopying duplication, 197 (*See also* Duplicating processes)
Photolithography, 198
Pins, 172, 440
Planning, 2, 32–33, 411–430
  of arrangement, 262–272 (*See also* Arrangement, office)
  conditions always present in, 417
  cost of, 427–428
  definition of, 411
  department for, (*see* Planning department)
  elements of, 412
  forms and mechanisms used in, 420–422
  graphic record in, 422
  individual, 412, 415
  involved in all work, 411
  master planning, 413–414
  of nonroutine work, 419
  organized, 412, 415
  poor, results of, 411–413
  preplanning, 412, 415
    scientific, 413–414
  present in all offices, 411, 412
  principles governing, 415
  reports, system of, 413–414
  requirements for, 416
  route sheet used in, 420–422
  of routine work, 420–422
  scientific preplanning, 413–414, 415
  and scientific thinking, 416
  size of office doing, 414–415
  of special assignments, 422
  of special work, 419–420
  standardization prerequisite to, 50
  why necessary, 49–50
Planning department, 25, 53, 415
  duties of, 416–419
    act as central information bureau, 418
    analyze needs, 416–417
    assign work, 417–418
    care for special and rush work, 418–419
    classify data, 418
    calculate bonuses, 419
    develop flying squadron, 419
    develop improvements, 418
    keep statistics, 418

Planning department, duties of, maintain routines, systems, standards, 418
operate and control service functions, 418
set standards, 417, 428
supervise organized training, 418–419
forms used by, 420–422
must pay its way, 427–428
need of more than one, 420
personnel of, 427
Planning office arrangement, 266–272
mapping flow of work in, 269–270
symbols used in, 268
templets, use of, in, 270–272
Pneumatic tubes, 90
Policies, standardizing, 108–109
Policy, question of, 41
Policy-making function, 39
Poor Richard, 431
Position analysis, 345–349
Posting machines, 215
Posture chairs, 183
Premium plans (*see* Incentives)
Preplanning, 413–416, 419
(*See also* Planning)
Prestandardization work, 395–397
Principles, of organization, 41–42
of planning, 415–416
of progressive assembly, 78
of scheduling, 425–426
of scientific office management, 26–34
analyzing the problem, 28
finding the facts, 28–30
finding the right method, 30
finding the right person, 31
getting the work done, 33–34
organization, rules of, 41
planning, 32–33
stating the problem, 27
training the right person, 31–32
Printing tabulator, 205
Private offices, 228–233
advantages, 228–229
construction of, 233
Private offices, cost of, 231
disadvantages, 229–231
location of, 232–233
when advisable, 231–232
Problem, analysis of a, 28, 358–359
Problems for solution:
Bonner-Poole, 143
Brown Knitting Mills, 391
Carter Hosiery, 82
Community Chest, 211
Davis Brush, 143
General Manufacturing, 429
Harrison Company, 335
Hart Manufacturing, 336
Indiana Manufacturing, 124
Iroquois Knitting, 193, 236, 257, 274
Jenks and Keane Pharmaceutical, 75
Kelly Manufacturing, 56
Kingman Manufacturing, 36
Maxfield Button, 429
McLean Button, 163, 211
Milady Soap, 102
National Graphite, 177
Norcross & Company, 143
Old Colony Rope, 221
Parker Company, 124
Popular Priced Stores, Inc., 356
Proctor Pencil, 294
Western Pencil, 372
Wisconsin Mutual Liability Insurance, 103
Wollaston Knitting, 390
Procedures and procedure charts, 64–68
Production records, 130
Profit sharing, 339
(*See also* Incentives)
Progress, record of, 388
Psychological factors in office control, 47–48
Punch card systems, 204
Punctuation, test of, 297, 301
Purchase records, 129–130
Purchase-order system, 7
Purchasing agent, location of, 264

Q

Qualification card, employee's, 319–320
Quantity of forms to order, 151–152
Questionnaire, use of, in filing survey, 132–133
Quitting, reasons for, 323–324

R

Rating scales, 349–351
Reading copy, 122
  training in, 329–330
Reception of new employees, 320–322
Reception clerk, 291–292, 346
Reception room, 233–235
  fixing space requirements of, 234
Record keeping, 125–131
  analyzing, rules for, 129
  classification, 131
  modern tendencies in, 128
  principles of, 125–126
Records, 1, 125–131
  analyzing, rules for, 129
  classification of, 131
  designed to order, 127–128
  destruction of, 135
  and filing, 131
  labor turnover, 131
  modern tendencies in, 128
  personnel, 130–131
  production and cost, 130
  purchase, 129–130
  purposes of, 126–127
  sales, 130
  stock, 130
  as tools, 127
References, employment, 318–319
Relation of office to general business, 1–16
Releasing employees, 315
Repair man, 292
Repetitive work, measurement of, 383–384
Reports, 19–20
  eliminating, 20, 438
  of filing department, 136
Reports, in planning, 413–414
Reserve-stock plan, 170–171
Responsibility, assigning, 41
  delegation of, 52
Rest periods, 406–407
Rest rooms, 228
Reward for effort, problem of, 338–340
  (*See also* Incentives)
Riegel, John W., 348n.
Route sheet, 387, 420–422
Routine work, 53
Routines, 58–73
  analysis of, 61–64, 68
  building new, 71–72
  charts of, 64–68
  dominant, 261
  dominating factors in, 73
  establishment of, principles, 68–71
  factors in, 73
  flow charts of, 64–68
  formation of, 60
  kinds of, 59
  of letter writing, 105–106
  necks in, 68–70
  new, building, 71–72
  objectives of, 73
  planning of, 420–422
  as a planning mechanism, 33
  purposes of, 61–62, 70
  reconstructing, 71–72
  standardizing main operations in, 396
  study of, 60, 396–397
  synthesis of, 71–72
  visualizing the problem of, 61–64
  when justifiable, 62
Rubber for floors, 254
Rubber bands, 172
  substitute for, 440
Rule, slide, 216–217
Ruled lines in forms, 156–158
Rules, for correspondents, 116–117
  of organization, 41–42

S

Salary standardization, 344–354
Sales analysis, 14

Sales records, 130
Savings from economy, 444
(*See also* Economy)
Scale for measuring work, 383
Scheduling, 2, 54
allowances in, for delays, 425–426
clerical hours available for, 425
data needed in, 424, 425
definition of, 411, 423
of dictation, 107
factors to consider in, 425–426
follow-up of, 426
in mail-order houses, 426–427
of nonroutine work, 426
plan of work, 423
principles governing, 424–426
quantity of work subject to, 424
of special, unrelated tasks, 424
what is involved in, 423–424
Science in management, 27
measurement the test of, 373
Scientific analysis, 357–370
apparatus, use of, 365–366
carbon paper, test of, 363
definition of, 357
definition of scientific experiment, 362
determining method of making test, 364–365
error in, minimizing, 368
experiments, making, 360–370
(*See also* Experiments, scientific)
expert, outside, use of, 369–370
basis of employment of, 370
human element, eliminating, 367–370
limiting purposes of tests, 362–364
literature, study of, 364
major steps in, 357–360
metal-cutting experiments, 361
objective, definition of, 358
observations, comparing, 368
limiting, 359
making, 359–360
recording, 360, 366–367
organizing, work of, 369
outlines, use of in, 359
Scientific analysis, by planning department, 416–417
principle of office management, 28, 357
of the problem, 358–359
purpose of, 366
requirements of, 357
results to be expected from, 370
of a routine, 61–64, 68
studying results of, 369
Taylor, Frederick W., 360–361
testing validity of information, 364
variables, eliminating or controlling, 365–366
whose responsibility, 369
Scientific control, 50–52
(*See also* Control; Experiments, scientific)
Scientific experiments, 360–369
apparatus for, selection of, 365–366
controlling variables in, 365–366
on cutting of metals, 360–361
definition of, 362
eliminating error in, 368–369
human element in, 367–368
limiting purpose of, 362–364
magnifying certain factors in, 365
observations in, comparing of, 368
limiting, 359
making of, 359–360
recording of, 366–367
preliminary survey in, 363
purpose of, limiting, 362–364
recording of observations in, 366–367
scientific thinking, 357–360
selecting the method of making, 364–365
studying results of, 369
Taylor's, Frederick W., 360–361
in testing carbon paper, 362–363
validating information, 364
variable conditions in, 365
Scientific management, 15
Scientific method, 26–34
Scientific office layout, 258–272

Scientific office management, importance of, 26
principles of, 26–34
Scientific preplanning, 413–416
(*See also* Planning)
Scientific thinking, 357–360
and planning, 416
Scott, Walter Dill, 319
Sealing machines, 206
Secretarial desks, 191–192
Secretaries, private, 24–25
Section-head type of worker, 282–283
Semi-indirect lighting, 246
(*See also* Lighting)
Service departments and planning department, 418
files, 262
location of, 262
mailing, 262
operation of, 262, 263, 418
stenographic, 262
Services, economy in use of, 442–443
Setting standards, 392–408
(*See also* Standardization; Standards)
Shelves, for filing, 138
for stockroom, 170
Shock absorbers in tests, 205
Signaling devices, 91
Simplification, 11, 20
Sizes of forms, 149, 153
Slide rule, 216–217
Sliding scale of bonuses, 341
Smoking in offices, 228
Sorting devices, 191, 203–204, 209
Sound absorption, 253
Space, office, 222–235
allowances for in layout, 271–272
expansion, providing for, 223–225
lighting, 227, 250–251
(*See also* Lighting)
location of, selecting, 222–223, 225–226
private offices, 228–233
(*See also* Private offices)
Space, office, reception room, 233–235
shape and size of, 227
ventilation, 226, 250–251
(*See also* Arrangement, office)
Span of control, 42
Special assignments, 422–423
Special work, planning of, 418–420
scheduling of, 424
Specialists, 333
Specialization, 42
Specification, job, 285–286, 306, 316, 318
standard, for forms, 157
Speed habits, 72, 330
Spelling, test for, 297, 300
Spirit duplicator, 199
(*See also* Duplicating processes)
Square-inch method of measuring work, 385
Staff-investigation type of worker, 282
Stamp affixing machines, 206
Standard paragraphs, 407–408
Standard practice instructions, 289, 322, 328, 407–408
for correspondents, 115
writing of, 115
Standard specifications, of forms, 157
Standard tests, 298
Standard type faces for forms, 149–150
Standardization, 25, 54
analyzing existing method, 397
of company policies, 108–109
of correspondence methods, 109–110
cycle of motions, 402
definition of, 392
describing new method, 400
of desks, 180–182
of equipment and materials (*see* Desk; Economy; Equipment; Forms; Machinery, office; Stationery and supplies)
of filing methods, 132
of form sizes, 149

Standardization, fixation of work habits necessary to, 392–393
habits, work, in, 392–393
how to begin, 395–397
of janitor work, 292
of main routine, 396
of maintenance, 292
micromotion study in, 398, 400
motion study in, 398–400
motions, cycle of, 402
of nonroutine workers, 287–289
operations subject to, 394–395
of packing of forms, 152–153
of paper sizes, 148
partial, 395
of personnel, 276–277
(*See also* Personnel)
policies to follow in, 396
prestandardization work, 395–397
of quantities to order, 151–152
of reception clerk, 291–292, 346
requirements of, 397
of salaries, 344–354
standard practice guide, 407–408
of telephone usage, 290
time study in, 400–406
trend toward, 394
unmeasurable work not subject to, 395
unstandardized operations, 380, 381
variables, effect of, on, 394
work habits, fixation of, in, 392–393
work subject to, 394–395
Standardized operation, definition of, 380
Standardizing company policies, 108–109
Standards, 13, 52, 392–408, 427
definition of, 393
factors in devising, 394
National Bureau of, 148
no universal, 394
setting of, 343–344, 397–408
how determined, 398
motion study in, 398–400
describing new method, 400
Standards, setting of, motion study in, micromotion study, 398, 400
by planning department, 417, 428
time study, 400–406
allowances to make in, 405–406
definition of, 400
delays, allowances for, 405–406
elements in, 402–408
fatigue, allowance for, 406–407
how many to make, 403
preparing the subject for, 405
purpose of, 402, 405
rest periods, allowance for, 406–407
selecting subjects for, 403
sheet for, 403, 404
stop watch, use of in, 401, 405
unit times, recording, 408
when to be used, 400
who should do, 427
Starting salaries, 353
Stationery and supplies, 164–176
amount to keep on hand, 165–166, 168
automatic pencils, 173
cabinet for, 138
carbon paper, 173, 439–440
clips, pins, and paper fasteners, 172, 440
consumption of, control of, 160, 171–172
cost of, elements in, 165
economy in use of, 435–446
(*See also* Economy)
forms (*see* Forms)
fountain pens, 173
ink, glue, paste, and mucilage, 174
inventory, control of, 175
issuing system for, 166, 168, 171–172
pencils, 172–173, 439
problem of, 164
requisition system for, 166

Stationery and supplies, reserve stock plan, 170–171
savings possible in, 164–165
small items of, 172, 174
stock keeping for, 165–171
arrangement of stock, 166
centralization of, 169
classification of stock, 166–168
layout of stockroom, 167, 169–170
location of stockroom, 166, 168
requirements of, 165–166
shelving, 170
stock limits in, 175
stockroom, layout of, 167, 169–170
location of, 166, 168
typewriter ribbons, 174, 438–439
used in desks, 188, 190
waste of, 164–165
(*See also* Economy)
Statistical machines, 203–205
Statistical work, 2, 14
of planning department, 418
Stencil duplicating, 198
(*See also* Duplicating processes)
Stenographers, desk system for, 191
duties of, 345, 346–348
tests for, 303–304, 310
Stenographic section, 24, 420
location of, 264
Steps-in-squares chart, 65
Stock-keeping section, 25
Stock records, 130
Storage, 165–171
(*See also* Stationery and supplies)
Straight-line flow, 259–262
advantages of, 259–260
analysis of, 261–262
definition of, 259
effect of, on messenger service, 260
relation of workers to, 264–265
testing, 260
Street, Elwood, 211
Studebaker desk, 181–182
Style in correspondence, 110–112, 117
Subdivisions, nomenclature of, 44
Superfluous work, eliminating, 11–12
Supervision, by planning department, 416–419
(*See also* Control)
Supplies, 164–176
savings possible in, 144, 164–165
(*See also* Stationery and supplies)
Survey, of card indexing, 141
procedure for, 395–397
Symbols, standard, for equipment, 268
Synthesis of new routine, 71–72
Systems, for desks, 184–190
purchase order, 7
simplification of, 11
trend of, 10

T

Tables, calculation, use of, 216
for circularizing, 191
for machines, 191
for mail opening, 191
for sorting, 191
Tabulating machines, 203–205, 215
Tarr, W. E., 181
Taylor, Frederick W., 23, 340, 360–361, 366, 406
Teacher, qualifications of, 332–333
Telautograph, 90
Telecord and Telediphone, 207
Telephone, conduits for, 227
controlling use of, 290–291
holder for, 186
standard methods of using, 290
types of, 91
Telephone operator, 290–291
job description of, 346
Teletypewriter, 90
Templets used in office layout, 270–272
Testing flow of work, 260
Tests and testing, 296–313
administration of, 306–307, 308
of arithmetic, 304
of bookkeeping, 304, 309–310

Tests and testing, of calculating machine operation, 310
construction of, 304–306
definition of, 296
essential considerations, 298, 306
examiner's qualifications for, 307
of filing ability, 304, 310–311
of general information, 302
of general intelligence, 297
for executives, 319
giving of, 306–307
grading of, 299, 305
of grammar, 207, 300
Joint Committee on, 307
of letter composition, 302
of machine transcription, 310
of mental alertness, 319
National Clerical Ability Tests, 299, 307–313
certificates of proficiency, 312
construction of, 312
general plan of, 309
genesis of, 307–308
Joint Committee, 307, 311
objectives of, 308–309
recognition, provision for, 312
sampling tests, 309, 313
scoring of, 312
subjects included in, 309–311
bookkeeping, 309–310
calculating machine operation, 310
filing, 310–311
fundamentals, 309
general information, 309
machine transcription, 310
stenography, 310
typing, 310
where given, 311
occupational test, 296
primary test, 299
of punctuation, 297, 301
purpose of, 296, 307, 308–309
sampling, 309
shock absorbers in use of, 305
of special abilities, 297–298
spelling, 297, 300
standard tests, 298
Tests and testing, standardization of, 306
for stenographers, 303, 310
trade tests, 296, 298, 307, 308–309
by trial and error, 296–297
of typing ability, 297–298, 303, 310
Theoretical capacity, 79
Thinking functionally, 39
Tickler file, central, 135
for desks, 186
Time study, 400–406
of card indexing, 139–140
who should do, 427
(*See also* Standardization; Standards)
Time unit, 380
Timekeeping, for measurement, 386
on unstandardized operations, 381
form for, 382
Toilet facilities, 255–256
Tools, desk, 187–188
Towne, Henry R., 361
Trade tests, construction of, 304–306, 312
essential considerations in, 298–299
for file clerks, 304, 310–311
primary, for office work, 299
purpose of, 296, 298, 307, 308–309
for stenographers, 303–304, 310
for typists, 297–298, 303, 310
Training, 13, 131–132, 327–334
cost of, 331–332
developing habit of speed by, 330
in envelope addressing, 329–330
of filing force, 132
flying squadron in, 333
how far to carry, 331
individualizing, 332
by instruction on the job, 328–331
in laying out work, 329
for nonroutine tasks, 289
old method of, 327
preliminary, 327
selecting instructors for, 332–333
for special work, 328
standards of, 328

Training, standard practice instructions for, 328
supervised by planning department, 418–419
by trial and error, 296–297
in typing envelopes, 329–330
in using correct motions, 329
versatility, developing by, 333–334
Transcriber, duties of, 345
Transcription, 118–122
(*See also* Typewriting transcription)
Transferring, methods of, 134–135
(*See also* Filing)
Trays, desk, 186
Trend of office management, 9–15
Turnover of employees, 297, 326–327
(*See also* Personnel)
Type faces, for forms, 149–150
Type-and-ribbon duplicator, 198
(*See also* Duplicating processes)
Types of office workers, 281–283
Typewriter ribbons, 174, 438–439
Typewriters, 208–209
Typewriting, paper for, 147
Typewriting transcription, 118–122
analyzing faults of typists, 118–121
carriage throwing, 120
erasures, 118
inserting paper, 119
manicured nails, 120
physical adjustment, 119
platen twirling, 119
position of copy, 119
posture, 118–119
removing paper, 120
rhythm, 121
stroking keys, 121
tabulator use, 120
touch system, 120
errors, causes of, 121–122
disturbing conditions 121
lack of interest, 121
lack of proper training, 122
physical defects, 121
reading of copy, 122
Typewriting transcription, errors, spelling, 122
high output, how achieved, 118
supplies, economy in use of, 435–441
(*See also* Economy)
Typewritten matter, measurement of, 384–385

U

Underfloor conduits, 227, 265
Unit of measurement, 375–381
Unit of work, definition of, 380
Unit plan of flow, 78–79
Unit times, recording, 408
Unit work plan, 380–382
United States Employment Service, occupational dictionary of, 347
United States Railroad Labor Board, 348
United Typothetae of America, 148
Unstandardized operations, accounting for, 381
definition of, 380
timekeeping on, 381

V

Variables in experiments, controlling, 365–366
Ventilation, 226, 250–251
in private offices, 233
report of committee on, 251
Vertical filing, 136–137
Visible indexes, 138–141
Visitors, reception of, 291–292
Volume, work, unequal, 79–80

W

Wage-payment incentives, 338–344
(*See also* Compensation of employees)
Waiting room, 316
Walls, color of, 249–250
Waste, 431
causes of, 431

Waste, due to lack of control, 22
of electricity, 434
of equipment, 433
forms of, 432
how to prevent, 433–446
of human effort, 434
of materials, 433
of money, 433
saving a habit, 432
of services, 433–434
three classes of, 432
Watch, stop, 401, 405
Water for drinking, 255
Westinghouse Electric & Manufacturing Company, 347
Wheeldex, 141
Work, ahead, estimating, 53
flow of, 76–81
interruptions to, 80–81
Work charts, 64–68
Work habits, 71
formation of, 392–393
(*See also* Standardization; Standards)
Work organizer, 187
Work-unit plan, 341, 380–382
Work volume, 79–80
Workers, office, types of, 281–283
Working conditions, 238–256
(*See also* Heating; Lighting; Noise; Ventilation)
Write-up, organization, 44
Written instructions, 407–408