CONFIDENTIAL.

NOTES

ON THE

WAR EFFORT

IN

HYDERABAD

JANUARY 1941

CONTENTS.

FOREWORD.

The following notes, which have been compiled with the object of bringing out the directions in which the war effort in Hyderabad can be strengthened, are not intended to form a complete review of what has been done in the State and deal only with those aspects with which I am concerned. No mention, for instance, has been made of the placing of units of H. E. H. the Nizam's Regular Forces at the disposal of the Crown or of the recruitment and training of Reserve Officers. Similarly no reference has been made to the most generous assistance afforded by His Exalted Highness the Nizam, His Exalted Highness the Nizam's Government and the people of the Dominions in providing funds for the maintenance of Air Squadrons and the purchase of aircraft for the defence of England, or to the valuable contributions to H. E. the Viceroy's War Purposes Fund and other War Charities.

9th January 1941. E. W. SLAUGHTER.

Manufacture of Material for the Gun Carriage Factory at Jubbulpore.

INTRODUCTION

In October 1939 personal contact was made with the Master General of the Ordnance in Delhi, the outcome of which was that he agreed to arrange for orders to be placed on the Nizam's State Railway Workshops for the manufacture of war material Accordingly, an officer from the Ordnance Department and the Superintendent of the Gun Carriage Factory, Jubbulpore, visited Hyderabad in December 1939, to survey the capacity of the Shops for the manufacture of either (*a*) shells, or (*b*) components for the Gun Carriage Factory

On the completion of these surveys, it was suggested to the Master General of the Ordnance that the Railway Shops should undertake the manufacture of material for Jubbulpore in preference to shell work

FIRST ORDER

Accordingly, the first order for the manufacture of gun carriage components was received on the 28th March and 11th April 1940, which involved the manufacture of approximately 6,200 parts

Prior to this, orders for additional machine tools were placed to augment existing facilities and form a reserve for a long war

SECOND ORDER

As the result of requests for additional work, enquiries were received for the manufacture of a further 8,400 parts and an estimate was submitted on the 25th June 1940 The actual order was received on the 26th September 1940, but the majority of the material was not to hand until the 9th November 1940.

PROGRESS

Based on the progress made with the first order, it was expected to complete the second order in 4 months from receipt of material, but there is every indication that the work will be completed in 2½ months, that is, by about the end of January 1941, and this gives an indication of the increase in the rate of output in the shops

As the original order was capable of being met with single shift working, the Master General of the Ordnance was asked what further assistance could be rendered, and on the 26th June 1940 a letter was received from the Director of Ordnance Factories, asking for the full resources available to be placed at their disposal, and for an officer to be sent to Jubbulpore to settle details This survey was completed at the beginning of July and as a result the Shops were asked to estimate for the manufacture of further material.

THIRD ORDER.

This estimate was submitted on the 5th September 1940, and involves the manufacture of some 8,500 parts. The order has not yet been received from the Contracts Directorate, although it is understood from the Gun Carriage Factory that it will be placed, and material has started to arrive. Purchases of raw material necessary to execute the order are also being made.

This third order involves approximately three times the amount of work undertaken hitherto, and taking into consideration the machinists under training in the Workshops and at the Training Centre who should become available for simple manufacturing processes during the next few months, it is expected to complete this order in six months' time.

FURTHER ORDERS

Advice has also been received that the Gun Carriage Factory is selecting further work which might be undertaken here, but in view of the time taken to negotiate orders and obtain material, if nothing is heard in the near future a senior officer will be sent to Jubbulpore to obtain particulars of additional work available for manufacture by the Trade

DIFFICULTIES

There have been complications in obtaining orders due to cancellations and modifications of design and while it is appreciated that the Gun Carriage Factory have their difficulties, it would appear that there is a time lag between the Gun Carriage Factory and the Contracts Directorate, resulting in delay in the placing of orders. Incidentally, it would appear that manufacture could be speeded up and considerable correspondence saved if the Gun Carriage Factory were to place orders direct on the Railway instead of through the Contracts Directorate

DILUTION OF LABOUR

The rate of outturn of war material is increasing as machinists with sufficient training become available Skilled machinists are not available locally and it has been necessary to train staff specially for the night shift introduced in October 1940 and as a result considerable dilution of labour has been effected One-third of the present machine shop staff is only partially trained, and in order to obtain the maximum output from such staff, they are employed on repetition roughing operations; the more accurate finishing work being performed by the skilled staff.

WORK UNDERTAKEN

The following table indicates the amount of work which has been undertaken at Lallaguda with the assistance of the P. W. D Shops:—

Description.	Number.
Plate cover brake drum	1,688
Shoe brake (pairs)	1,688
Bracket draft eye	48
Bracket draft eye cap	96
Stud wheel cone seating	3,504
Nut wheel cone seating	3,504
Stub axle	1,988
Plate retaining	1,988
Hub wheel	1,988
Hub cap	600
Stud FL 930	4,500
Cam brake shoe	1,500

THE P W D WORKSHOPS

The P. W. D. Shops were surveyed by the Railway and available capacity is being utilised for the manufacture of gun carriage components, a night shift having been introduced for this purpose. A process of dilution of labour similar to that explained above is also being followed.

ENGINEERING COLLEGE WORKSHOPS

The Osmania University Engineering College machine shop has for some months been controlled by the Railway to enable (a) the better training of machinists after completion of early training at the Training Centre, and (b) the manufacture of simpler forms of locomotive material to release machines in Lallaguda shops for the manufacture of more accurate war material.

ROAD TRANSPORT WORKSHOPS

No mention has been made in the foregoing of the manufacturing facilities available in the Road Transport Department Workshops or the Mint. In the case of the Roads shops the reason for this is that the few machines which are available are fully employed on the manufacture of material for Roads Department vehicles operating essential public services which has become necessary due to the difficulty experienced in obtaining supplies of spare parts in India and from the United Kingdom. A double shift is necessary to achieve the manufacture of the material required and this will be started immediately suitable trainees from the Training Centre are available Further, these shops are concerned with the very heavy training scheme for driver mechanics for the Army in India, *vide* page 5

THE MINT WORKSHOPS

The facilities in the Mint Workshops consist of specialised plant for rolling and light pressing work and although negotiations have taken place it is unfortunate that no suitable work has yet been found which can be undertaken

POLICY

As it has been decided that the Locomotive Workshops should concentrate on the manufactue of components for the Gun Carriage Factory, every effort has been made to obtain work up to the maximum machine capacity available after meeting normal demands for rolling stock maintenance, and this policy will be continued

WORK DONE FOR MILITARY AUTHORITIES

During recent months, in addition to work for the Gun Carriage Factory, valuable assistance has been rendered to the Army Ordnance Department and some 5,500 items, chiefly gun mountings, have been manufactured and fitted to military vehicles A rush order for the manufacture of 354 complete sets of anti-aircraft gun mountings has just been completed in eight working days --

111	Table tops } for wireless tables
222	Drawer guides }
222	Drawers.
411	A A. Mountings tubular.
842	Gun swivels.
84	Spare base plates for A. A. Mountings
960	Forward mountings
102	Rifle bucket fittings
40	A. T. Rifle fittings
467	2 × 1¼" teak battens.
467	Protector for base plate studs.
740	Superstructure support brackets
6	Map cases.
792	Towing eyes complete with bolts, nuts and washers.
5,466	TOTAL NUMBER OF ITEMS.

SECTIONS INVOLVED IN MANUFACTURE.

It should be noted that the majority of work undertaken has involved manufacture in only the machine, foundry and smithy sections of the Railway shops and in the machine shop of the P W. D. For suitable work in the same category additional capacity is still available in the sections of the workshops given below, provided additional skilled workmen and supervisors are forthcoming —

Lallaguda Workshops	..	Foundry, Machine, Smithy
P. W D Shops ..	..	Foundry, Machine, Smithy
Hyderabad Iron & Steel Co	..	Foundry

OTHER CAPACITY AVAILABLE

In addition, in the Railway Shops there is a certain capacity available for fitting and saw mill work, particularly on the wood working side, where additional work of a suitable nature could be readily undertaken It will be appreciated that from an economic point of view "balance" as between manufacturing processes and shops is important and it is unfortunate that demands to date have resulted in a press of work in certain shops and on particular types of machines.

The unexploited capacity of the Mint Workshops for rolling and light pressing work has already been referred to

PRESENT LIMITING FACTOR

Given suitable work, the present limiting factor, apart from the question of supervision, is the availability of skilled artisan staff This requirement was foreseen at the commencement of the war and steps were taken to increase the number of apprentices under training in the Railway shops. The important step in this connection, however, was taken in July 1940, when the Training Centre (See page 9) was opened and training commenced on a comparatively large scale

Training of Driver Mechanics.

INTRODUCTION. Very shortly after the outbreak of war the potential value of the Road Transport Department Workshops as a training centre, to assist in the mechanisation of the Army in India, was realised and the suggestion was made to the G O C, Deccan District, that the training of driver mechanics should be undertaken It was proposed to deal with 32 men at a time.

STAGE I This offer was gratefully accepted and on the 2nd January 1940, 32 men commenced a 15 weeks course of training as driver mechanics. A second course, which was attended by 24 men, was commenced on 15th April and a third course, to which only 13 men were sent, on 29th July

To enable these courses to be carried out, a new building with a floor area of 1,440 sq ft was erected in the Workshops but the actual training was carried out by existing Roads Department staff in addition to their normal duties

STAGE II As a result of the experience gained from the courses referred to above, the Military Authorities were advised that the facilities offered might be expanded and made into a continuous course, the period being reduced from 15 weeks to 9 weeks by deleting subjects which were not likely to be of particular advantage to the type of men being trained and adding a short period of experience in daily maintenance of vehicles in public service It was intended that this continuous course should be fed by drafts of 8 men a week up to a total of 72 under training at any one time

The proposal was accepted by the Military Authorities and courses started on 26th August Entries were admitted only upto 16th December due to the introduction of the scheme referred to in Stage III and against the provision for the training of 136 men, 101 were actually sent for enrollment Of these the training of 45 has been completed to date. This expansion was achieved without any additional accommodation or instructional staff

STAGE III As a result of experience gained with Stage II it was considered that further expansion was possible provided that a training school entirely separate from the main Workshops was established with a special staff of full time instructors It was accordingly proposed to the Military Authorities that the weekly incoming drafts should be increased from 8 to 24 up to a total of 216 under training at any one time New buildings with a total floor area of 3,600 sq. ft were erected and an exchange with existing Road Transport Department buildings effected to give a total covered floor area for training purposes of 6,600 sq. ft.

The number of instructors required to meet this expansion is 24 but although difficulty has naturally been experienced in finding suitable men it has been possible to organise the course by the careful dilution of labour in the department.

Considerable difficulty was also experienced in finding the requisite equipment. 8 complete petrol engines which were suitable, 4 stripped

and partly sectioned chassis, 8 vehicles in running order and a large number of other small parts and tools had to be provided.

Training under this scheme was commenced on the 30th December 1940, 1/12 of the vacancies being allotted to H. E. H's Regular Forces, and the Military Authorities are taking full advantage of the facilities offered. It is interesting to note that men are being sent here from Quetta, Calcutta, Abbotabad and from other stations all over India and are drawn from British and Indian Army, Artillery, Cavalry, Infantry, and Service Corps units

NUMBER OF MEN TRAINED

Up to the present a total of 114 men have completed their training as driver mechanics including 13 from H E H's Regular Forces Under existing arrangements approximately 1,1000 men will be trained during 1941.

The full cost of this training is being borne by H. E. H. the Nizam's Government

The limiting factor in the training of driver mechanics is the availability of efficient instructors and when more can be found, the existing school—216 men—is capable of still further expansion

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Hyderabad Company R I. A S. C. (M. T.)

INTRODUCTION

The Government of India recently appealed to the States to undertake to supply the whole or part of an R I. A S C. Company and H E H the Nizam's Government immediately offered to raise a full company

THE SCHEME

The raising of this Company involves the recruitment of some 500 men including all ranks. The Officer Commanding and the 4 Section Officers will be provided by the Indian Army and it is hoped that as far as possible they will be individuals connected with Hyderabad The Viceroy's Commissioned Officers, all senior N C Os and the nucleus of the junior N C Os will be provided by H. E. H. the Nizam's Regular Forces. The recruitment, construction of quarters and technical training is being undertaken by the Railway Department and the military training, clothing, feeding and discipline by the Army Department of H. E. H. the Nizam's Government

PROGRESS

The officers and N C Os to be furnished by H E. H. the Nizam's Regular Forces have started undergoing technical training in the Road Transport Department

The Company will contain 470 drivers (of which 76 have also to be trained as mechanics) and to avoid delay in training this number, over 80 instructors have already been trained in the Roads Department, the men being found from drivers already in the service, their places being taken by the temporary promotion of other staff and recruitment.

The number of vehicles required for training purposes is approximately 100 and these will be obtained by hire and purchase both inside and outside the State. The buildings to be provided include class rooms, barracks, mess halls, wash houses, cook houses, store rooms, offices, quarter-guards and cells, and are being built by the Railway on the old Recreation Club ground at Chilkulguda where the hockey ground will be utilised as a barrack square. The buildings are being so designed that they can be converted as quarters for railway staff Water, electric light and main drainage are being provided

COST The entire cost of raising this Company is being borne by H E. H the Nizam's Government and a sum of Rs. 6 lakhs has been sanctioned to cover the cost of buildings, equipment and training vehicles and the maintenance and training of the Company for six months

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Training of Pilots.

INTRODUCTION In October 1939, just after the outbreak of war, at a meeting specially arranged with R A F officials and the Director of Civil Aviation, it was explained that there were 3 full sized aerodromes in the State at Begampet, Aurangabad and Adilabad, and that the one at Begampet was provided with all the facilities of a first class airport, *viz* , hangar space, administrative buildings, night landing equipment, wireless communication, etc It was also mentioned that the State had under consideration the construction of an aerodrome at Bidar which would provide runways over a mile long and would be an ideal centre either for a Training School or for an Air Force unit With these facilities in mind, an offer was made to train the personnel for a flight unit at the expense of H E H's Government The proposal was not accepted because the Government of India were not certain at that stage what could be done with the men after they had been trained.

On the 3rd June 1940, however, under the scheme for the expansion of the Indian Air Force, Hyderabad was asked to train pilots recruited in British India and assist in the local recruitment and training of ground staff. H. E H. the Nizam's Government then offered to produce and train at their expense 15 Hyderabadi pilots and 100 mechanics in the first place.

Pending arrangements being made by the Government of India for the commencement of training at Begampet, volunteer pilots were called for in the State and 20 selected applicants were sent to Ambala to appear before the Air Force Selection Board The result was that 5 men were selected for immediate recruitment as pilots in the Indian Air Force, 2 were offered entry 4 months later and 4 Anglo-Indians were offered non-commissioned rank in the R. A. F.

CIVIL AIR RESERVE CORPS

In August 1940 details were received of the Civil Air Reserve Corps scheme and 10 pilots recruited by Air Headquarters commenced a four months course of training at Begampet Aerodrome on 19th December 1940 Each candidate is required to put in 80 hours flying during the course and machines belonging to H E. H's. Government are being utilised with the assistance of one additional machine which is expected from the Government of India In addition to flying instruction and instruction in ground engineering, the syllabus provides for lectures in Mathematics, English, Navigation, Legislation, Meteorology, Bookkeeping, First Aid and Physical Training and for the subjects outside the scope of the Aerodrome personnel, Instructors and Lecturers have been found locally Accommodation has been provided for the trainees in a bungalow adjacent to the Aerodrome

AIR FORCE ELEMENTARY FLYING TRAINING SCHOOL

Under the Air Force Elementary Flying Training School scheme the details of which were recently settled after discussion with the I A F representative, H E. H the Nizam's Government have agreed to Hyderabad being one of the four centres set up and it is expected that training will commence about 21st February 1941 Under this scheme 24 pilots selected by Air Headquarters from the various civil training centres will be trained in a course extending over a period of 12 weeks The training will be under the direction of Air Force Instructors and 14 training machines and 5 Civilian Pilot Instructors will be employed The additional machines necessary to carry out this training will be provided by the Government of India but H E H's. Government in their Air Department will be responsible for the maintenance of all the machines and for the provision of the 5 Civilian Pilot Instructors As an additional facility H E H. the Nizam's Government have sanctioned a sum of Rs 37,000 for the purchase of a Link Trainer.

Under this scheme each trainee will be required to complete 50 hours flying and approximately 100 trained pilots will be turned out in the course of a year

Accommodation for these men while under training presents some difficulty and rather than waste money on temporary buildings, H.E.H's. Government have under consideration an extension of the Airport building which will provide proper accommodation for trainees and when no longer required for this purpose can be taken over by the Air Department and the Aero Club as office accommodation etc.

To provide adequate hangar accommodation at Begampet to house the extra machines required under this scheme, arrangements are now being made for the construction of an additional hangar

GROUND STAFF TRAINEES.

Twenty extra trainees for the ground staff, to supplement the existing ground staff, are being appointed to cope with the additional work under the two flying training schemes.

Technical Training Centre—Kachiguda.

INTRODUCTION.

In the course of negotiations with the Government of India regarding the use to be made of the facilities available in Hyderabad for the training of Air Force personnel, H. E. H's. Government were asked to assist in the local recruitment and training of ground staff. H. E. H's. Government immediately offered to produce and train at their expense 100 mechanics in the first place and the necessary arrangements were proceeded with pending formal acceptance of the offer.

TECHNICAL TRAINING COMMITTEE

To meet this commitment and to provide a source of training for skilled men to cope with the manufacture of war material in the State, a Technical Training Committee, under the direction of the General Manager of the Railway, was set up by H. E. H's Government consisting of four officers, each an expert in his own branch of engineering, and given the necessary powers for recruitment and training A main training centre for which accommodation was available in the abandoned Road Transport Department Workshops at Kachiguda was decided upon and the necessary expenditure for equipment authorised by Government. A member of the Committee was placed in charge of the school and an officer was seconded by Government to act as a full time Secretary Machinery and tools were purchased, and loaned from Government Departments and benches made. The selection of candidates for training was carried out by a competent sub-committee and actual training commenced in July 1940

PROGRESS

Development proceeded rapidly under the direction of the Committee which held weekly meetings and by December 1940 in addition to 120 men under training as mechanics for the Air Force 26 machines had been installed and a double shift on the training of machinists introduced. The Engineering College Workshop of the Osmania University which had been taken over by the Railway Department to assist in the production of war material is also being utilised for training purposes, men being sent there after completing a preliminary course of instruction at Kachiguda, for further training while actually engaged in production. The number of men under training as machinists in both these centres at the end of 1940 was about 80 making a total approximately 200 trainees for which the Training Centre was responsible.

All trainees are given a salary of O. S. Rs. 10 or O. S. Rs. 15 depending on whether or not they have had any previous workshop experience and are provided with khaki shirts and shorts to serve as an uniform For those trainees who are not able to live at home a hostel has been established in the upper storey of the adjacent railway station and is under control of the Secretary to the Committee.

VISIT OF AIR FORCE SELECTION BOARD.

In the middle of December 1940 an Air Force Selection Board visited the Training Centre and out of 113 Air Force trainees interviewed 92 were selected for direct entry into the Indian Air Force or enrolled in the Reserve. In addition, 7 men actually under training as machinists and 20 volunteers from local schools and colleges were also enrolled making a total of 119. Advice was subsequently received from Air Headquarters that 34 had been selected for immediate entry to the Air Force and they left for Ambala on December 28th. Advice has also been received

that a further 35 may be required in about a month. The number of men under training for the Air Force will be kept at 120 and steps have been taken to fill the vacancies caused by those who have already left.

TRAINING SYLLABUS

A detailed syllabus of training has just been introduced both for trainees already enrolled as well as for new entrants, to simplify training and reduce the number of Instructors necessary This syllabus includes training on air frames and engines and arrangements have been made for the full time services of two Instructors to be made available from the staff at Begampet Aerodrome Arrangements have also been made for the trainees to be given physical training each day by Instructors provided by H E. H the Nizam's Regular Forces

ARTISAN TRAINING SCHEME

A fresh survey of all possible sources of training for the engineering trades has just been carried out and it was decided to introduce an Artisan Training Scheme to supplement the training of machinists already in hand with the object of providing adequate resources of labour in additional trades to meet the expansion of engineering industries in the State

It is estimated that the training of about 400 young men will be undertaken in the Training Centre, the Osmania Technical College and suitable local Workshops, in the following categories.—

Fitters .. .	185
Blacksmiths	46
Moulders ..	20
Welders	20
Millwrights	20
Electricians	25
Draughtsmen .. .	20
Turners ..	50
Shapers, slotters and millers ..	20
	406 *

Advertisements were issued for suitable applicants to meet this demand and the response has been excellent. The selection is almost complete and a considerable number have already commenced training H E. H's Government have authorised the additional expenditure which will be incurred.

SUMMARY.

Including the Air Force trainees the total number of men under training for which the Training Centre is responsible will be over 500 and it will be appreciated that this presents a formidable task Every endeavour is being made to obtain more Instructors and to supplement the existing machine tools in the Centre with machines available in the State which are not already engaged in essential production.

* **For the latest position see Appendices A and B.**

With the completion of this scheme, the full resources of the State for the training of artisans in the trades for which there is an urgent demand will have been mobilised and there will be no centre cabable of training men of the artisan class which will not be taking its full share in the war effort

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Knife Factory.

MANUFACTURE OF CLASP KNIVES

The Government of India is in urgent need of clasp knives and an order for 200,000 at Rs 2 each has been accepted after careful thought and considerable practical experiment An existing building is being turned into a factory under the charge of the Mint Master Grinding and drilling machines have been acquired either by local manufacture or by purchase This factory will provide employment for about 500 men and boys and is in effect the creation of a new industry as it will be capable of executing orders not only for clasp knives but for other items in the cutlery and allied trades for which there is a constant demand in normal times It will be appreciated, however, that continuity of work is an important factor in an undertaking of this nature

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Clothing Factory.

CUTTING AND TAILORING OF UNIFORMS

With the assistance of the Hon Member for Supplies of the Government of India arrangements have been made with the Supply Department for the establishment of an Ordnance Clothing Factory in Hyderabad and H. E H the Nizam has graciously handed over his palace at Begampet for this purpose Supervisory staff appointed by the Supply Department have established the Inspection and Cutting Departments of the Factory About 200 men recruited locally are required in the Cutting Department and a number of these are receiving special training Tailoring will be given out to local contractors and the jails Khan Bahadur Ahmed Alladin & Co. propose to employ about 1,000 men on this work distributed over four centres at Bolarum, Secunderabad and in Hyderabad

Other War Supply Orders.

In addition to the manufacture of war material already referred to orders for the following war supplies have been or are being executed in Hyderabad.

BLANKETS 6,500 Army blankets have so far been supplied by the Cottage Industries. Work is proceeding and the importance of this to both the State and the war effort is receiving close attention

BUTTONS 20,000 gross of galvanised iron buttons have been supplied. Severe competition has been experienced in this line and although Hyderabad has probably the largest button industry in India, with a total capacity of approximately 420,000 flat buttons per day, only 20,000 gross have so far been ordered. Sample buttons supplied by outside firms do not appear to compare well with those manufactured in Hyderabad

HORSE BITS An order for 2,300 bits placed with the Hyderabad Iron & Steel Co is nearing completion. The Railway, Mint and P. W D Workshops have assisted in manufacture

EYELETS 12,000 gross have been manufactured by one of the larger button factories.

TENTS An educational order was placed with Khan Bahadur Ahmed Alladin and Co. for 370 tents. 1,000 men were engaged, and the order satisfactorily executed. A further order for 2,500 tent walls was then received. The dosuti used is supplied by the Osmanshahi Mills

TENT POLES The Hyderabad Construction Company have completed an order for 4,500 assorted tent poles A further order for 15,000 poles is now being negotiated

Investigations into Industrial Resources.

The following are brief notes on the recent investigations which have been made into the Industrial resources in the State in connection with the war.

NITRO-CELLULOSE

Raw Materials —are (1) cotton, fibre, bamboo pulp and grass fibre, all of which are available in Hyderabad, (2) nitric acid, and (3) sulphuric acid, both available in India. Proposals are on foot to produce sulphuric acid in Hyderabad (See page 14)

Manufacture. —Nitration is simple and can be carried out without difficulty.

Uses,—(*a*) nitrocellulose lacquers—for aeroplane dopes, lacquering of metals, leather and textile fibres (*b*) cellophane paper for waterproof wrappings (for food and toilet articles). (*c*) Toilet articles.

Samples of transparent anti-gas eyeshields have been produced and sent to the Controller of Supplies, Madras, for approval

This is an industry which might be established.

GLASS ENAMELS AND ENAMEL WARE

Raw Materials.—Felspar, Lime and Soda Ash The first two are available in abundance in the State.

Manufacture —Scientific skill is necessary for the manufacture of glass enamels, and the Laboratory experiments in the production of glass enamel for enamel ware and decorative articles have been successful Negotiations are proceeding to launch this industry.

PLASTICS CASEIN PLASTICS

Raw Materials.—Casein, formaldehyde and soda ash

Casein is available in Ahmedabad, but there are possibilities of manufacturing from skimmed milk in Hyderabad, as well as of producing vegetable caseins from oil cakes

Formaledhyde is available in India

The quantity of soda ash required is very small, *viz* , from 1% to 2%.

Manufacture.—The manufacture of casein plastics requires special plant and presses. The Laboratory experiments have yielded a satisfactory product.

Uses.—Buttons, combs, brush handles, piano keys, etc., can be produced from casein plastics.

BAKELITE PLASTICS

Raw Materials.—Wood meal and defatted oil cakes, available in Hyderabad, and phenol and formaldehyde, available in India.

Manufacture.—The manufacture of bakelite powders requires technical skill and experiments in the Laboratory have been carried out to produce powders of good moulding properties. Presses and moulds have been recently purchased and installed in the Laboratory experimenting room.

Uses.—All types of moulded articles can be produced, and it is proposed to explore this industry commercially. There is considerable scope for development and the matter is receiving active attention.

MEDICINAL GLUCOSE

All kinds of starches are available locally for the manufacture of glucose Samples of liquid glucose have been sent to the Director General of Medical Stores, Bombay, and with the exception of a minor defect in colouring, the second sample was approved as British Pharmacoepia standard Consideration is now being given to the possibility of establishing a permanent industry

GLYCERINE AND SOAP

The oils and fats required exist in abundance in the State. A surplus of caustic soda will be available from the Sirpur Paper Mills in 3 to 4 months' time Active consideration is being given to establishing this industry on a factory basis

CARDBOARD

A very cheap raw material, in the form of begasse and grasses, for the manufacture of cardboard is available locally Experiments show that the cardboard produced is strong and of good quality.

MEDICINAL DRUGS

Atebrin, sulphonamides, coramine, and benzedrine—which were all of enemy origin—have been produced synthetically The processes of manufacture have been studied, and are now available for exploitation

GLASS

Raw materials —Quartz, lime, felspar and soda ash. The first three are available in excellent quality in the State A Glass Factory is already in existence and is producing items in every day use, such as tumblers, lamp chimneys, etc Proposals are now under consideration to establish a much larger factory which it is hoped will produce sheet glass of which there is a grave shortage in the East

LEATHER GOODS

Hides and skins marketed to Bombay and Madras are considered to be of the first quality Prospects for the establishment of a Sole Leather Tannery are promising, and attention has been given to this question and an expert asked for his opinion

IRON ORE.

Mr Musgrave, M. I M. M , of the Southern Rhodesia Delegation to the Eastern Group Conference, generously carried out a brief survey of the iron ore deposits in the State Further borings and tests are now being made in accordance with his recommendations, to ascertain the quantity and quality of the ore available

SULPHURIC ACID

A deposit of iron pyrites, rich in sulphur content has been found at the Tandur Collieries The Colliery Authorities expect to produce about 40 tons of pyrites a month, the sulphur content of which is about 45 per cent There are also other deposits of pyrites in the State. 100 tons of pyrites, containing 35 per cent sulphur, assuming 100 per cent recovery efficiency, would yield 100 tons of pure sulphuric acid; or 116 tons of double oil of vitriol, or 137 tons of brown oil of vitriol. A by-product would be iron-oxide There are alternative processes for the production of sulphuric acid from pyrites, namely, the Contact process, and the Lead Chamber process. In either case it is probable that the type of plant required could be fabricated in India and enquiries are being made in Northern India in this connection. The amount of

machinery required would be small. Although the actual quantity of sulphuric acid produced from pyrites might be on the small side, in view of the shortage of sulphuric acid in India, this quantity would prove an asset.

GARNETS About 40 tons of garnets, suitable for abrasive purposes, are immediately available and much larger quantities are obtainable in the State.

GRAPHITE Large quantities of graphite are available in the State. Purification tests are being carried out to ascertain the quality

VEGETABLE OILS A vital problem in India is to find further uses for the vegetable oils which are available, and the following are under consideration —

(a) HYDROGENATION Government have accorded the necessary licence to two concerns for the establishment of factories for the production of hydrogenated oil and they are now negotiating for the machinery and plant required

(b) LIGHTING A lamp has been designed to enable the ryots to use vegetable oils for lighting purposes

(c) GREASES The Railway has experimented with vegetable grease for the lubrication of locomotive motion, but as this was inclined to be fibrous in texture laboratory experiments are being carried out to remedy this

(d) PLASTICS See notes on bakelite plastics

(e) GLYCERINE AND SOAP See note above

CASTOR OIL Hyderabad is the fifth largest producer of castor seed in the world, and a serious problem has arisen regarding disposal of the surplus now available in the State

Despite the high original cost, the Railway has been using castor oil as a lubricant for locomotive motion and axleboxes for the last two years with excellent results

With a view to finding additional uses for castor oil, experiments are being carried out to ascertain whether it could be used as a substitute for mineral oils for lubrication purposes in internal combustion engines

The Chief Chemist of the Industrial Laboratory produced as pure a sample of castor oil as possible, for experimental purposes This was tried in an engine in the Roads Department and after 258 hours' running on the test bench, the engine stopped due to lack of compression A further trial with treated castor oil, yielded somewhat better results, but similar difficulties arose and the trial had to be abandoned after about 350 hours' running. The oil was found to lose its lubricating qualities and the resultant wear on the parts of the engine were such that it was obviously not a practical proposition.

The problem was discussed with the Director of Scientific and Industrial Research to the Government of India, and he recommended the treatment of the oil with anti-oxidants. Experiments in this direction are now in progress.

It is anticipated that if the oil is treated for acidity, and is anti-oxygenated, an oil as good as Gargoyle can be produced. The main problem in launching this as a commercial proposition is the fluctuations in the price of castor oil.

Experiments have also been undertaken to find other commercial uses for castor oil, *e. g.*, in the production of cheap plastics; for medicinal purposes and for chemicals, and in the production of greases.

CONCLUSION

From the foregoing notes it will be apparent that whilst every effort has been made since the commencement of hostilities to utilise to the full the machinery available for the manufacture of war material, the training of men in one category or another forms a considerable portion of the war effort in the State. It has been recognised consistently that the availability of skilled labour is the governing factor in Hyderabad as well as elsewhere and in addition to the training of driver mechanics to meet the needs of the army in India the problem of training artisans has been given unremitting attention. Within the next few weeks roughly 1,480 men will have been put under training in the various centres from the commencement and some 230 of these are already actively engaged in furthering the war effort. With the steady advance of this formidable training programme it is hoped that an appreciable number of men will be available to meet the demands for skilled staff occasioned by the anticipated expansion of war time activities in Hyderabad.

The notes on the Investigations into Industrial Resources in Hyderabad and the War Supply Orders received indicate that in this direction there is very considerable scope for expansion. In this connection the following points require to be brought out :—

(1) The geographical position of Hyderabad is not always taken into consideration by the Supply Department and several enquiries have been received calling for the return of tenders in a ridiculously short period although the sealed samples were many hundred miles away.

(2) To enable production to be considered information of the demands as far ahead as possible should be forthcoming.

(3) To enable satisfactory production to be attained enquiries should be made as early as possible in advance of requirements and on a long term basis.

(4) Consideration should also be given to the modification of existing designs and specifications for war supplies to simplify manufacture by commercial concerns.

(5) Drawings and specifications issued by the Supply Department are not always sufficient to enable manufacture to be undertaken by firms with no previous experience of such specifications and in order to make the full use of facilities available it is essential for samples to be readily obtainable It is considered that the size and importance of Hyderabad is sufficient to warrant the setting up of a Sample Display Centre in the State. This question has already been taken up with the Supply Department but no satisfactory arrangement has yet been made although Display Centres have since been established in other parts of India.

Hyderabad,
Dated 9th January 1941.

E. W. SLAUGHTER.

APPENDICES.

APPENDIX A.—The trades included in this statement are reproduced from the pamphlet "Scheme for the Training of Skilled Artisans" issued by the Department of Labour of the Government of India For the present it is only intended to train men in those trades for which there is a demand, as shown in Appendix B Where capacity exists for training in the remaining trades, however, this has been indicated

The figures shown under the column "want" do not take into account men required to meet any major armament development in Hyderabad.

APPENDIX B—This statement gives particulars of the present distribution of trainees, recruited under the Artisan Training Scheme, to the various workshops and does *not* include the mechanics under training for the Air Force at the Technical Training Centre, Ground Staff Trainees at the Aerodrome, or additional apprentices engaged in the Loco and Roads Workshops to meet demands occasioned by the war. The numbers included in this statement are those for which arrangements are being made at the present time but are subject to alteration in the light of experience and development.

APPENDIX 'A'.

Survey of Training Capacity and Likely Demand.

Trades.	Loco. Shops.		Knife factory.		Roads Shops.		Elec. Dept.		Mint.		O T.C.		U'sity & Trg. Centre		PWD.		Shah-abad.		Collie-ries		Others.		Total.	
	Want.	Can train.	Want.	Can train.	Want	Can train.	Want.	Can train.	Want.	Can train	Want.	Can train.	Want.	Can train	Want.	Can train	Want.	Can train.	Want.	Can train.	Want.	Can train	Want.	Can train.
*Fitters ...	10	50	60	...	..	15	15	10	8	1	.	16	...	100	12	12	...	...	...	...	...	...	105	204
Machinists ...	...	..	...	...	...	.	...	...	14x	..		...	..	...	...	...	...	...	...	..	...	...	14	...
*Millers ...	6	6	..		2	...	..	..		..		..	.	6	1	1	..	...	...	...	..	...	9	13
Grinders .	...	6	60	..	1	...	..	...	...	..	...		..	2	1	..	...	...	..	...	..	...	62‡	8
*Blacksmiths ...	20	20	20	...	..	2	6	2	...	...	.	20	...	6 (U)	2	6	...	...	...	...	...	...	48	56
†Tin & Coppersmiths	...	10	10		...	1	2	1	.	...	...	...	...	..	2	...	...	...	...	...	...	...	14	12
*Moulders .	20	20	...	..	...	..	10	4	..	...	..		..	20 (U)	...	12	...	...	...	...	...	..	30	56
†Carpenters .	..	30	..	...	...	...	.	..			...	.	..				..	..					...	30
*Welders	...	10		...	.	1	2	1					.		..	2	. .	6		..	..	.	2	20
*Millwrights	15	15			2		1			..	. .	.		...	...	..	...	...	. .	...	...	...	18	15
†Painters ..	...	30	..	...	..	1	..	.	...	..	.	.	...		.	..	..	...	...	...	...	...	Nil.	31
Upholsterers .	...	10	..	...	...	1	...	.	...	..	.	.	..	.	.	...	...	..	.	...	...	...	Nil.	11
*Electricians .	...	4		...	3	...	5	6		...	. .	20	...	.	...	..	..	...	...	..	...	...	8	30
*Draughtsmen ..	.	4	...	...	...	..	1	.	. .	.	...	20	...	...	1	...	..	. .	..	...	...	...	2	24
Surveyors ..	...		. .	...	.		..	...	.	.	..	..			...	...	..	..	..	..	...	..	...	...
Steam E D ..	...	..	...	...	...	...	..	...	..	..	..	...	.		. .		..	..	...	...	...	...	...	...
Oil E. D ...	..	..	..	.	...	..	. .	...	..	..	...	...	..	.	.	..	...	.	.	...	...		...	...
Wireless Operators	...	..	...	...		...	. .	.	.			.			...	.	..	.		.	...	...	...	...
Pattern makers .	.	5		...	...	...	2	..	...	...	...	...	...	.	. .	...	...	...	...	...	...	...	2	5
*Turners ...	40	40	...	...	14	.	4	2	2	1	.	..	...	62(TC) 12(U)	12	6	...	6	...	...	...	...	72	129
Boiler Attendants..	...	2	...	...	...	...	..	...	...	...	...	..	..		...	...	...	..	...	...	...	..	..	2
Toolmakers ...	..	...	...	...	...	...	...	...	...	...	..	...	...	.	1	...	. .	...	...	...	...	...	1	...
*Shapers ...	10	10	...	...	...	...	1	1	. .	...	...	...	...	12(TC) 4(U)	...	2	...	4	...	...	...	...	11	33
*Slotters ...	6	6	...	...	...	...	...	...	...	...	..	...	...	8(TC) 2(U)	...	1	. .	...	...	...	...	...	6	17
*Motor Mechanics...	...	...	...	...	20	20	...	...	...	..	.	.	...	. .	...	2	...	...	..	...	...	...	20	22
†Masons ...	...	4	...	...	...	...	...	...	...	...	. .	...	...	...	..	. .	...	...	...	...	...	...	...	4
*Electroplaters ...	...	4	...	...	...	...	...	...	4	2	...	...	...	...	1	...	...	...	...	...	...	...	5	6
Other Artisans ...	...	...	...	...	Body fit. ters 4		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4
Die Sinkers ...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...
Total ...	129	286	150	...	42	45	49	27	28	4	...	76	...	234	33	44	...	16	...	...	...	...	431	732

1. This is a precis of the returns submitted by the Managers of the various workshops.
2. * These are the trades in which training will be given.
3. † Adequate numbers available in local labour market.

X Mint type, no other shops can train.
TC=Training centre.
U=University.
‡ Special type of "grinders" for knife factory—other shops cannot train.

Trades and Distribution.

Trade.	Number to be trained.	DISTRIBUTION.										
		Lallaguda.	Roads Dept	Electricity Department	Mint	O T C	P. W D.	Training Centre	University Machine Shop.	Shahabad Cement Works.	Singareni Collieries.	Others.
Fitters	121	50	15	10	.	16	12	18 *	..	.	...	...
Millers	13	6	.	...	...	.	1	4	2	..	..	...
Blacksmiths ...	56	20	2	2		20	6	.	6		.	...
Welders	12	5		.	..	.	1	.	.	6	.	...
Moulders	40	22	..	5		..	13	.		..	..	...
Millwrights	15	15	...	.	.			.	.		.	...
Electricians	20	...	...			20 †	.		.	..	.	...
‡ Draughtsmen ...	20	.			.	20					..	...
Turners	129	40	..	2	1		6	62	12	6	..	...
Shapers	19	5	.	.	..	...		10		4	..	...
Slotters	10	2	.	.	.	.	.	8		..	..	..
Motor Mechanics ...	22	...	20 $				2	..	.	.	..	..
Electro-platers ...	6	4	..	..	2		.	.	.	...	...	..
Total ...	483 §	169	37	19	3	76	41	102	20	16	...	..

* Can train more, if required, up to a shift of 80 at night

† With some practical work at the Mint.

$ Commence training as last category.

‡ These trainees to be Matriculates

The above excludes —

(a)	Mechanics under training for Air Force ..	120
(b)	Ground Staff trainees at aerodrome . ..	20
(c)	Additional apprentices in Loco shops	34
(d)	Additional apprentices in Roads shops .	15
	Total ...	**189**

§ This represents the programme on 6th February 1941 which will be increased as machines and instructors become available