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TESTS AND REAGENTS

CHEMICAL AND MICROSCOPICAL

KNOWN BY THEIR AUTHORS' NAMES, TOGETHER WITH AN INDEX OF SUBJECTS. COMPILED FOR THE USE OF CHEMISTS, MICROSCOPISTS, PHARMACISTS, STUDENTS, ETC.

BY

ALFRED I. COHN, PH.G., PH.D.

AUTHOR OF "INDICATORS AND TEST-PAPERS". MEMBER OF THE AMERICAN CHEMICAL SOCIETY; SOCIETY OF CHEMICAL INDUSTRY; VEREIN DEUTSCHER CHEMIKER; ETC.

NEW YORK

JOHN WILEY & SONS, INC.

LONDON: CHAPMAN & HALL, LIMITED

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Entered at Stationers' Hall.

PRESS OF
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BOOK MANUFACTURERS
BROOKLYN, N. Y.

PREFACE.

THE matter here presented was compiled from a great number of sources (the small brochures of Altschul, Schneider, and Wilder having served as a nucleus), and with very numerous additions was published in a series of monthly installments in MERCK'S REPORT, from March 1900 to September 1902; it is here republished by the kind permission of Messrs. Merck & Co. Since its first appearance in serial form, however, the matter has been further greatly amplified.

The compilation has been made with a view to supplying the busy chemist, microscopist, and pharmacist with data which are frequently desired, but which are often either not at hand, or inaccessible. While the nature of the subject precludes any claim being made as to completeness, it is believed, nevertheless, that the contents of the volume will be sufficiently extensive to be of practical utility.

ALFRED I. COHN.

NEW YORK, January, 1903.

TESTS AND REAGENTS.

Abram (LEAD IN URINE). Add ammonium oxalate to urine (1:150 and introduce metallic magnesium (wire or rod). Lead is precipitated on the magnesium, and can be identified by warming with fragment of iodine—yellow lead iodide; or dissolving in nitric acid and applying other reagents. Sensitive to 1:50,000.

Adamkiewicz (ALBUMIN). Acetic-acid solutions of albuminous substances are colored violet by conc. sulphuric acid, and show greenish fluorescence. A similar reaction results if albumin is treated with a mixture of 1 vol. conc. sulphuric acid and 2 vol. glacial acetic acid. Heating hastens reaction, and, according to Wurster, so does addition of a few grains sodium chloride. Gelatin gives no reaction.

Adamkiewicz (NERVE-CENTER STAIN). Harden sections in Müller's solution for 1 to 3 months, wash with water, then with water acidulated with nitric acid, then stain with conc. solution safranine. Remove superfluous color, clear with alcohol and clove oil, pass into water again, wash in water acidulated with acetic acid, stain with methylene blue, and clear as before. Myelin is stained red; nuclei violet.

Adams (FAT IN MILK ANALYSIS). Dry a known quantity of milk on a fat-free paper coil, then extract latter with ether in a Soxhlet apparatus.

Adrian (DIFFERENTIATING NATURAL AND ARTIFICIAL METHYL SALICYLATES). Carefully overlay 5 Cc. methyl salicylate on 5 Cc. conc. sulphuric acid. A synthetic product affords a slight development of heat and a faint pink color. Natural oil develops decided heat, and liquid becomes pink, changing to a wine-red and finally reddish-brown.

Adrian (ESTIMATING GUAIACOL). 1.—Heat 100 Gm. with 10 Cc. water for 1 hour in a current of HBr gas, take up residue (containing pyrocatechol and homopyrocatechol) with ether, evaporate solvent, and treat residue with benzene. From weight of pyrocatechol so obtained and after recrystallizing, calculate percentage of guaiacol. 2.—Dissolve 5 Gm. guaiacol in a little water and 10 Cc. alcohol, and make up solut. to 1,000 Cc. Mix 20 Cc. solut. in a test tube with 1 Cc. 1:100 $NaNO_2$ solut. and 1 Cc. dil. (1:200) HNO_3—characteristic reddish-brown color develops, and is compared within 10 minutes with that of a standard solut.

Agostini (GLUCOSE). Mix 5 drops urine, 5 drops 0.5-% gold-chloride solution, and 3 drops 20-% potassa solution and warm gently; sugar will give a red color.

Alferow (SILVER STAIN). Acid solution of silver picrate (or lactate, acetate, or citrate), prepared by adding 10 to 15 drops conc. solution of acid of the salt taken to 800 Cc. solution of salt.

Alfraise (IODINE). Add 1 drop hydrochloric acid to 10 Cc. water containing 1% each of starch and potassium nitrate, and boil. 1 drop of this reagent gives blue color if iodine present in suspected liquid.

Alleger (GELATIN MOUNTING PROCESS). Add few drops formaldehyde to each gramme 0.5- to 1-% gelatin solution. Mount section in this, heat slide till paraffin is softened, and let gelatin excess drain from edge of slide.

Allen (EMBRYO STAIN). Dissolve 1 part methylene blue and 7½ parts sodium chloride in 1,000 parts water, and dilute with 15 to 20 volumes sea-water.

Allen (FATS, VEGETABLE). Shake together equal volumes fat and nitric acid (sp. gr. 1.4) for ½ minute, then set aside for 15 minutes. Vegetable fats (cottonseed oil) afford coffee-brown color.

Allen (FEHLING'S TEST, MODIFIED). Boil 7 to 8 Cc. urine, add 5 Cc. Fehling's cupric-sulphate solution, cool, and add 1 to 2 Cc. faintly acid saturated solution sodium acetate. Filter, add 5 Cc. Fehling's alkaline tartrate solution, and boil.

Allen (NITROGEN IN URINE). Modification of Knopp's method. Boil 25 Cc. urine with 10 Cc. strong sulphuric acid in porcelain

dish till volume reduced to 10 Cc. and sulphuric acid vapors evolved. Transfer liquid to Kjeldahl flask, add 5 Gm. potassium sulphate, and heat till liquid pale-yellow. Cool, neutralize with conc. caustic soda, and add water to 100 Cc. Treat 10 Cc. of neutral solution with alkaline hypobromite as in urea estimation. Each Cc. nitrogen = 0.0012 Gm. urea (approx.).

Allen (PHENOL). 1 or 2 drops suspected liquid, few drops of hydrochloric acid, and 1 drop nitric acid, give purple-crimson if phenol present.

Allen (SPIRIT NITROUS ETHER). Fill an Allen nitrometer with strong brine and introduce 5 Cc. spirit to be tested. Then add 5 Cc. strong solution potassium iodide, then 5 Cc. dil. sulphuric acid. Shake. When action ceases, adjust surfaces of liquid in both limbs to same level; read off volume of nitric oxide, and add 1.5 Cc. as correction for solubility of gas in solution. Multiply volume by 0.0638; result = parts ethyl nitrite in 100 by weight of spirit.

Allen (STRYCHNINE). Extract with ether, concentrate by letting fall by drops into warmed porcelain capsule, cool residue, and treat with sulphuric acid and manganese dioxide. Strychnine gives violet color.

Allen (ZINC IN SOLUTION). Few drops of potassium-ferrocyanide solut. causes white precipitate in slightly alkaline, boiling solution containing zinc.

Allesandri-Guaceni (NITRIC ACID; NITRATES). Dissolve a few Gm. phenol in hydrochloric acid by heating 12 hours on water-bath. Heat 10 drops of reagent with dry residue of suspected liquid on water-bath. Nitric acid or nitrates give intense violet color, changed by ammonia to green.

Almén (ALBUMIN). 1.—4 Gm. tannin, 8 Cc. 25-% acetic acid, and 190 Cc. 40- to 50-% alcohol. Also precipitates nucleoalbumin. 2.—Mix 1 part 2-% tannin solution in dilute alcohol with 6 parts urine. Albumin causes turbidity.

Almén (BLOOD). Shake liquid containing blood, with mixture of equal parts guaiac tincture and turpentine oil; becomes blue owing to oxidation of guaiac resin. Color is permanent on heating. See also *Weber* and *Schoenbein*.

Almén (CARBOLIC OR SALICYLIC ACID). Dissolve mercury in

fuming nitric acid and dilute solut., with double its vol. of water. Add 5 to 10 drops of reagent to 20 Cc. of liquid and boil—carbolic or salicylic acid affords a yellow ppt.; on adding nitric acid until ppt. is dissolved liquid acquires a red color. Sensitiveness, 1:400,000.

Almén (GLUCOSE). Digest 2 Gm. basic bismuth carbonate with 100 Cc. potassa solution, sp. gr. 1.33, and 4 Gm. Rochelle salt, cool clear solution and decant from precipitate. Boil 1 Cc. of reagent for several minutes with 10 Cc. of urine. Glucose produces yellowish-brown precipitate, which becomes darker, and finally black.

Also known as *Boettger-Almén* reagent. Compare with *Nylander's* solution.

Almén (HYDROCYANIC ACID). Make solut. alkaline with soda lye, add yellow ammonium sulphide, evaporates to dryness, exhaust residue with water, then add hydrochloric acid and ferric chloride. In concentrated solutions a blood-red color develops—in very dilute an orange-red. Sensitiveness, 1:4,000,000.

Almén (PHENOL). 1.—Dissolve 1 part mercury in 1 part nitric acid sp. gr. 1.4, and dilute with 2 volumes water. On heating to boiling 5 to 10 drops of this with 20 Cc. solut. containing phenol yellow precipitate forms, soluble in nitric acid with red color. 2.—Blue color forms on adding ammonia and chlorinated-soda solution to phenol solution.

Almén-Nylander (GLUCOSE). See *Almén's* glucose test.

Alpers (ALBUMIN IN URINE). Acidulate urine with hydrochloric acid, and add equal vol. of 1-per cent. mercury-succinimide solution—a white cloudiness forms. Sensitiveness, 1:150,000.

Alt (NERVE STAIN). Solution of Congo red in absolute alcohol. Squire recommends a 2-% aqueous solution.

Altmann (AMMONIUM MOLYBDATE). 2.5-% ammonium-molybdate solution containing about 0.25-% chromic acid.

Altmann (CORROSION METHOD). Inject tissue with olive oil, then immerse thin slices for 24 hours in 1-% osmic-acid solution, then treat with Javelle water for several hours till corrosion completed, finally dry with blotting-paper, and mount in glycerin.

Altmann (FIXING SOLUTION). Mixture of equal parts of 5-% potassium-bichromate solution and 2-% osmic-acid solution.

Altmann (IMPREGNATION METHODS). 1.—Immerse small portions fresh tissue for 5 to 8 days in mixture of 2 vol. olive oil and 1 vol. each of ether and absolute alcohol, then throw into water to precipitate oil in the tissue, next harden with osmic acid, corrode with Javelle water, and mount in glycerin. 2.—Impregnate with mixture of 2 vol. castor oil and 1 vol. alcohol, then proceed as in 1.

Altmann (NITRIC ACID). A 3- to 3.5-% aqueous solution used as a fixing agent. Sp. gr. about 1.02.

Alvarez-Jean (SULPHIDES, HYPOSULPHITES AND SULPHITES OF ALKALI METALS). Sulphides give a violet color with sodium nitroprussiate. Hyposulphites in dilute solution give a yellowish-brown precipitate with a conc. solut. of bismuth subnitrate and potassium nitrate in water with smallest possible quantity of nitric acid to effect solution. An excess of this reagent gives a precipitate also with sulphites.

Anderson (DISTINGUISHING BETWEEN QUINOLINE AND PYRIDINE SALTS). Chloroplatinates of the latter, boiled with water, are converted into insoluble double salts with liberation of hydrochloric acid; those of former remain in solution.

Anderson (PAPAVERINE). Dark-red color appears on adding concentrated nitric acid to solution of papaverine in dilute nitric acid, and yellow crystals separate.

André (QUININE). Chlorine and ammonia produce green color changing to blue on saturation with acid. Excess of acid changes color to violet or bright red, but ammonia again turns it green.

Andreasch (CYSTEÏN). On adding few drops of dilute ferric-chloride solution, followed by ammonia, to solution of cysteïn acidulated with hydrochloric acid, a beautiful red color forms and darkens on shaking, after exposure to air.

Andreasch (IRON). Dark purplish-red color forms on adding little ammonia and sulphoglycolic acid to solution containing iron; the color soon fades, but reappears on shaking after exposure to air.

Anstie (ALCOHOL IN URINE). Solut. of potass. bichromate 1, in conc. sulphuric acid 300. Add reagent by drops. Emerald-green color signifies presence of alcohol in toxic quantity.

Apathy (HEMATOXYLIN STAIN). Stain in 1-% solution hematoxylin in 70- or 80-% alcohol, and wash out in 1-% potassium-bichromate solution in alcohol of the same strength. Bichromate solution should be freshly made by mixing one part of 5-% aqueous solution with about 4 parts of 80- to 90-% alcohol.

Apathy (METHYLENE-BLUE PROCESS). Wash preparations stained with strong methylene-blue solution in salt solution (0.75-%), then place for an hour or more in freshly-prepared 1- to 2-% solution neutral ammonium carbonate saturated with picrate. If methylene-blue solution is very dilute omit treatment with salt solution. Afterwards immerse preparation in saturated solution of ammonium picrate in 50-% glycerin, then transfer to saturated solution of the picrate in mixture of 2 parts glycerin (50-%), 1 part of cold saturated sugar solution, and 1 part of cold saturated gum-arabic solution. When thoroughly penetrated, mount in Apathy's mounting medium.

Apathy (MOUNTING MEDIUM). Picked acacia 50 Gm.; cane sugar, 50 Gm.; distilled water, 50 Gm. Dissolve on water-bath and add 0.05 Gm. thymol. This medium sets very hard and, combined with a paper cell, may be used for ringing glycerin mounts.

Arata (ARTIFICIAL DYES IN WINE). Wool immersed in wine containing artificial dyes abstracts these from the wine. The fiber may be afterwards subjected to special reactions.

Archetti (CAFFEINE; URIC ACID). Heat a solution of potassio-ferric cyanide with half its vol. of nitric acid to boiling, then dilute with water. Reagent gives a precipitate of Prussian blue with caffeine (uric acid does also).

Arndt. Determination of sugar by means of the ferment saccharometer. See *Einhorn*.

Arnold (ACETO-ACETIC ACID IN URINE). *a*.—Dissolve 1 Gm. para-amido-acetophenone in 80 to 100 Cc. water by shaking and adding hydrochloric acid by drops, then add more conc. acid till solution is colorless. *b*.—Dissolve 1 Gm. sodium ni-

trite in 100 Cc. dist. water. Just before using mix 2 parts *a* with 1 part *b*, add an equal vol. urine, and 2 or 3 drops conc. ammonia water—an intense brownish-red develops with every urine. Now add 1 vol. of this colored urine to 10 to 12 vols. conc. hydrochloric acid—a beautiful purplish-violet develops if aceto-acetic acid present. Strongly colored urine should first be decolorized with animal charcoal.

Arnold (ALKALOIDAL TESTS). 1.—Some alkaloids, heated on water-bath with syrupy phosphoric acid obtained by dissolving metaphosphoric acid or phosphoric acid anhydride in 25-% phosphoric acid yield characteristic color reactions: Aconitine—violet; nicotine—yellow; coniine—green.

2.—Triturated with concentrated sulphuric acid, many alkaloids yield characteristic color reactions upon adding 30- to 40-% alcoholic (in some instances aqueous) potassa solution.

Arnold (CODEINE). Heat fragment with a few drops conc. sulphuric acid and add by drops an excess of a 30- to 40-% alcoholic or aqueous solut. potassa—mixture should remain colorless but a dirty-yellow develops, changing to lemon-yellow, if colchicine present.

Arnold (NARCEINE). On warming substance containing narceine with conc. sulphuric acid and trace of phenol, a reddish color forms.

Arnold-Vitali (ALKALOIDAL TESTS). Particle of alkaloid triturated with concentrated sulphuric acid, and a grain of sodium nitrate is added; then, strong alcoholic (40-%) potassa solution. Number of alkaloids give characteristic color reactions. Atropine and homatropine give orange color, which, on addition of potassa, becomes reddish-violet and fades to rose-red.

Arzberger (OIL PEPPERMINT). Warm 1 drop of oil with 5 Cc. formaldehyde—rose-red color develops (not given by menthol or menthenes). Add conc. acetic acid—a handsome red color forms, changing rapidly to violet-red and finally dirty-brown. Japanese oil does not give this reaction, and various peppermint oils give different colors. Spearmint, melissa, bay, lavender, and pinus oils do not give the reaction.

Ashby (MINERAL ACIDS IN VINEGAR). Logwood infusion (1:50) in boiling water. After standing few hours place few drops on porcelain, add drop of the suspected sample and evaporate to dryness on water-bath. If mineral acids present residue has red color. Pure vinegar leaves bright-yellow stain.

Astolfi (SANTONICA). Powder 1 Gm. of the substance and shake with 10 Cc. absolute alcohol for some time, then boil and filter. Now add a small piece caustic potassa and heat again —if article is good, distinct red develops; if much adulterated, color will be yellowish-red; if no genuine santonica present, sample will not color at all.

Austen-Chamberlain (NITRIC ACID). A rose-red color is produced with solution of 20 Gm. iron and ammonium sulphate, 2 Gm. sulphuric acid, and 100 Cc. of water.

Autenrieth (INDICATOR). Luteol (oxychlordiphenylquinoxaline). Gives with alkalies a yellow color, rendered colorless by acids.

Autenrieth-Hinsberg (PHENACETIN). Add 10- to 12-% nitric acid to powdered substance and heat to boiling—yellow crystalline needles deposit. Antipyrine and acetanilid do not respond.

Axenfeld (ALBUMIN). 0.1-% solution gold chloride. Acidulate solution to be tested with formic acid and heat with drop of reagent. If albumin present, solution becomes purplish-red; on addition of more gold chloride, blue. Latter color reaction also produced by glucose, starch, tyrosine, leucine, etc., but purplish color is characteristic of albumin.

Aymonier (ALPHA-NAPHTOL). 15-% alcoholic solution alpha-naphtol colored violet on adding cane sugar, and admixture of 2 vol. sulphuric acid. On addition of one drop of mixture of 1 part potassium bichromate, 10 parts water and 1 part concentrated nitric acid, the alpha-naphtol solution yields black precipitate. Beta-naphtol gives neither of these reactions.

Azoulay (OSMIC-ACID METHOD). Harden thin sections of material in Müller's solution, place for 5 to 15 minutes in osmic-acid solution (1:500 or 1:1,000), then rinse with water and leave for 2 to 5 minutes in a 5- or 10-% tannin solution, the latter being warmed meanwhile until vapor given off. After

washing in water, double-stain sections with carmine or eosine, and mount in balsam.

Babes (ACTINOMYCOSIS). Stain sections in Babes' safranine solution No. 3 for 2 minutes, rinse in alcohol, and decolorize in Gram's solution.

Babes (SAFRANINE STAINS). 1.—Mixture of equal parts concentrated alcoholic and aqueous solutions of safranine. 2.—Conc. or supersaturated solution made with the aid of heat. 3.—Mix 100 parts water, 2 parts aniline, and an excess of safranine. Warm mixture to 60° to 80° C. and filter through wet filter.

Babo (URIC ACID). Boil dilute Fehling's solut. with a urate of an alkali—cuprous oxide is precipitated. If uric acid present in excess, a white precipitate of cuprous urate also deposits, decomposed on boiling with caustic alkali into a urate and cuprous oxide.

Bach (BUTTER). Butter is soluble in 20 parts of a mixture of 3 vol. ether and 1 vol. 95-% alcohol at 19° to 21° C. Foreign fats, lard, tallow, etc., are insoluble or but slightly so, even on warming some degrees above 20° C.

Bach (COPPER). Mix equal molecular weights of formaldehyde in 20-per cent solution with hydroxylamine hydrochlorate (formaldoxim results). Add to 15 Cc. of solut. to be tested 0.5 Cc. of formaldoxim solution and 0.5 Cc. potassa lye—an intense violet develops in even very dilute copper solutions.

Bach (HYDROGEN DIOXIDE). *a*.—0.03 Gm. potassium bichromate and 5 drops aniline in 1 liter of water; *b*.—5-% oxalic-acid solution. Shake 5 Cc. of solution to be tested, with 5 Cc. solution *a* and 1 drop solution *b*; violet-red color forms if hydrogen dioxide present.

Bach (SOLANINE). Treatment with equal volumes sulphuric acid and alcohol develops a red color.

Bachmeier (ALKALIES). Tannin solution produces a red to reddish-brown color, changing to dirty green.

Bachmeier (ORGANIC ACIDS IN PHENOL). Aqueous Brazil-wood decoction is permanently discolored by organic acids, but not by phenol.

Baemes (TANNIN). Solution of 1 Gm. sodium tungstate and 2

Gm. sodium acetate in each 10 Cc. precipitates from acid or alkaline tannin solutions, straw-yellow precipitate insoluble in water.

Baeyer (EOSINE). Shake with water and sodium amalgam, heat gently, then dilute with water, and add drop of potassium permanganate solution—opaque green color appears in reflected light.

Baeyer (GLUCOSE). Heat solution with excess of nitrophenylpropiolic acid and soda—blue color appears if glucose present, owing to formation of indigo.

Bailey (NITRIC ACID). Crystals of the double compound of mercuric cyanide and potassium iodide turn black when introduced into nitric acid, but red in other acids.

Bailey (SULPHUR). A blood-red color forms on heating with sodium carbonate, dissolving in water and adding sodium nitro-prusside solution.

Balmer-Fraentzel (TUBERCLE BACILLI STAIN). Immerse sections for 24 hours in solution of 2 Gm. freshly powdered gentian violet in 100 Gm. aniline water. Subsequently treat as in Ehrlich's method.

Barbier (ALCOHOL IN ESSENTIAL OILS). A viscid solution is formed on distilling off about one-tenth and adding to distillate excess of dry potassium acetate. Compare Bernouilly's test.

Barbot (FATTY OILS). Fuming nitric acid with different oils behaves differently with regard to coloration and solidification—*e. g.*: Olive oil yields a white (not red or brown) mixture, which solidifies in 1 to 2 hours.

Barbsche (GLYCERIN). No blue color should be produced on adding one drop ferric-chloride solution to glycerin diluted with 20 volumes water containing one drop carbolic acid.

Barff (PRESERVATIVE MEDIUM). Saturated solution boric acid in glycerin (boroglyceride) is prepared by application of moderate heat for 4 or 5 hours. When required for use 1 part of solid product is dissolved in 40 parts by weight of water.

Barfoed (GLUCOSE). Solution of 14 Gm. crystallized copper acetate in 200 Cc. water, and 5 Cc. acetic acid; or, according to a more recent formula, 0.5 Gm. copper acetate, 100 Cc. water, and 1 Cc. acetic acid. Glucose reduces solution in the

cold, and more rapidly on heating. Dextrin, cane sugar, and milk sugar do not reduce solution. Used also for distinguishing between glucose and lactose in urine.

Barfoed (HYDROCYANIC ACID). Acidify solution with sulphuric or tartaric acid and shake with ether; the latter takes up hydrocyanic acid, but not hydro-ferrocyanic acid.

Barfoed (SILICIC ACID). Cautiously heat mixture of 1 part of suspected substance, and 2 parts cryolith with 4 to 6 parts of sulphuric acid, and hold near surface of mass a thin platinum wire loop containing a drop of water; white pellicle of silicic hydrate will form on the water.

Barral (ALBUMIN, AND BILIARY PIGMENTS). Overlay urine with a 20-% solut. sozolic acid—a white ring develops at contact point if albumin present; a green ring if biliary pigments.

Barralet (HYDROGEN DIOXIDE). The pale-blue freshly precipitated ferrous ferrocyanide obtained by adding solut. potassium ferrocyanide to a solut. of a ferrous salt is immediately changed into Prussian blue by hydrogen dioxide even in very dilute solution of H_2O_2.

Barreswil (CHROMIC ACID). Blue color appears on adding few drops of chromic-acid solution and a little ether to a very dilute, acidified hydrogen-dioxide solution.

Barreswil (GLUCOSE). Reduction takes place on boiling a liquid containing glucose with the following solution: 60 Gm. potassium hydroxide; 40 Gm. potassium tartrate, and 200 Cc. water; then dissolve 65 Gm. copper sulphate in 560 Cc. water and add the first solution.

Bartley (BILIARY PIGMENTS). On adding HCl and Fe_2Cl_6 to a liquid (*e. g.* urine) containing bile, an intense green color develops

Barry (HYDROCYANIC ACID). Acidify liquid slightly, if necessary, with acetic acid, then put 2 or 3 drops in a watch-glass. Cover with another watch-glass containing 2 or 3 drops 1-% silver-nitrate solution; latter becomes cloudy if hydrocyanic acid present.

Basham (BILIARY PIGMENTS). Shake liquid with chloroform, decant, evaporate chloroform, and add a drop nitric acid to residue. Play of colors, finally ending in ruby-red, ensues. Reaction very delicate.

Basoletto (SESAME OIL). Mixture of equal volumes sesame oil and 2-% solution cane sugar in hydrochloric acid, sp. gr. 1.124, is colored red in the cold, but more rapidly on heating. With glucose and lactose, color is produced only when mixture is boiled with the hydrochloric acid and allowed to become perfectly cold. Compare *Baudouin's* test.

Bastelaer (PHOSPHORUS IN TISSUES AND EJECTA). Dissolve out phosphorus with ether by repeated shaking, evaporate, add water at end of evaporation, warm to 50° or 60° C., shake with conc. ammonia, then wash with dil. sulphuric acid, and then with water. Residue = phosphorus, recognizable by its properties.

Bastian (GOLD STAIN). Solution of gold chloride (1:2,000), acidulated with hydrochloric acid (1 drop to 75 Cc.).

Bates (EXAMINING BACTERIAL CULTURES). Remove a little of growth by means of sterilized platinum hook or small loop, and spread on a cover-glass in as thin a film as possible. When almost dry allow one or two drops of weak aqueous methyl-violet solution to fall on film from pipette. Carefully turn cover-glass over on to a slide after a minute, then gradually remove excess of stain by gentle pressure with strip of filter paper.

Bates (SAFRANINE SOLUTION). Saturated solution in aniline 3 Cc. and distilled water 90 Cc., prepared at 60° C. and afterwards filtered.

Bates (STAINING KOCH COMMA BACILLI). Leave sections for 24 hours in aqueous solution fuchsine, then wash in distilled water faintly acidulated with acetic acid, or in sublimate solution (1:1000). Afterwards, pass rapidly through alcohol and clove oil, dry with filter paper, and preserve in balsam.

Bates (STAINING LEPROSY BACILLI). Stain with solution of rosaniline hydrochlorate in aniline water, decolorize in 33-% hydrochloric acid, and after-stain with methylene blue.

Bauer (SOLANINE). Add a few drops of a solution of telluric acid in diluted sulphuric acid to the alkaloidal solut. in a watch-glass and warm slightly on water-bath—a raspberry-red color develops and persists 2 or 3 hours. Reaction very delicate. Atropine, morphine, quinine, etc., do not give the reaction.

Baudouin (SESAME OIL). 0.1 Gm. sugar dissolved in 10 Cc. hydrochloric acid sp. gr. 1.18. One volume of solution is shaken with 2 volumes of oil to be tested. If sesame oil present, the oil on separation is cherry-red.

Lewin carries out reaction as follows: Cover 0.5 Gm. powdered sugar with 2 Cc. of oil in test-tube, and then pour 1 Cc. hydrochloric acid, sp. gr. 1.18, carefully down side of the tube. If sesame oil present, a rose-red zone appears within 1 to 5 minutes.

According to Millian, Baudouin's test is more delicate when carried out with well dried, free, fatty acids from oil to be tested.

Villavecchia and Fabris replace sugar and hydrochloric acid by furfurol. Compare also *Carlinfanti*, and *Gassend*.

Baumann (POLYATOMIC ALCOHOLS, CARBOHYDRATES, AND DIAMINES). Benzoyl chloride added to solution of alcohol or amine in aqueous soda-solution, produces insoluble benzoyl esters. Test can be used for detection of glycerin, carbohydrates and various bacterial products in urine.

Baumann-Goldman (CYSTINE). Benzoyl chloride, dissolved in aqueous sodium-hydroxide solution, throws down a precipitate of benzoyl-cystine.

Baumann-Preusse (HYDROQUINONE). Heat substance rapidly in open test-tube—violet fumes evolved, condensing as an indigo-blue sublimate if hydroquinone is present.

Baumgarten (BLEU DE LYON STAIN). Place sections of material previously stained with borax-carmine for 12 hours in 0.2-% solution bleu de Lyon in absolute alcohol, and wash out for 6 hours before mounting in balsam.

Baumgarten (FUCHSINE AND METHYLENE-BLUE STAIN). Place sections of material hardened in chromic-acid solution for 24 hours in watch-glassful water containing 8 to 10 drops conc. alcoholic solut. fuchsine. Rinse with alcohol, stain for 4 or 5 minutes in conc. aqueous solution methylene blue, wash out with alcohol for 5 to 10 minutes and clear with clove-oil. Nuclei are stained red, and tissues blue.

Baumgarten (LEPRA-BACILLUS STAIN). Stain 6 to 7 min. in cold dil. alcoholic solut. fuchsine, and decolorize for 15 seconds in acidulated alcohol (1 HNO_3 and 10 alcohol); rinse in water,

and double-stain in aq. solut. methylene blue. Lepra bacilli stain red on blue ground; tubercle bacilli do not stain in this space of time.

Baumgarten (TUBERCLE BACILLI EXAMINATION). Immerse cover-glass preparations in watch-glass of distilled water containing 1 to 2 drops 33-% potassa solution, then press down on slides and examine unstained. If putrefactive bacteria present, stain with aqueous fuchsine or gentian violet to distinguish from tubercle bacilli which remain colorless.

Baumgarten (TUBERCLE BACILLI, NEW METHOD FOR). Stain sections in watch-glassful water containing 4 to 5 drops conc. alcoholic methyl-violet solut. Wash in water, immerse for 5 minutes in semi-saturated potassium-carbonate solut. if necessary, and decolorize in absolute alcohol for 5 to 10 minutes. Pass through clove-oil, mount in equal parts Canada balsam (free from chloroform) and clove oil, place sections in alcohol for 5 minutes, then in conc. solut. of Bismarck brown in 1-% acetic acid.

Bayer (ACETONE IN URINE). Mix urine (or distillate) with equal vol. of solut. of nitrobenzaldehyde in water, then add soda or potassa to alkalinity—indigo blue formed. Sensitive to 1:2500. Also known as *Drewsen's*, or *Penzoldt's*, indigo test.

Bayer (INDOL). Indol solution yields red color or precipitate on addition of dilute nitric acid and dilute potassium-nitrite solution.

Bayerl (DECALCIFYING FLUID). Equal parts 3-% chromic-acid solut. and 1-% hydrochloric acid.

Bayrac (URIC ACID IN URINE). Evaporate 50 Cc. urine to dryness on water-bath, treat residue with hydrochloric acid (1:5), wash residue with alcohol, dissolve in 20 drops sodium-hydroxide solution heated to 90° or 100° C. on water-bath, and decompose with sodium hypobromite in apparatus for determining urea. Each 1 Cc. nitrogen at ordinary temperature equals 0.00357 Gm. uric acid.

Beale (AMMONIA CARMINE). 1.—Carmine, 15 grn.; strong solution ammonia, 30 min.; glycerin, 2 fl. oz.; alcohol, 6 fl. dr. This fluid was specially designed for purpose of staining by means of injection. 2.—Carmine, 10 grn.; strong solution

ammonia, 30 min.; distilled water, 2 fl. oz.; alcohol, 4 fl. dr.; glycerin, 2 fl. oz. Dissolve carmine in ammonia with heat, boil for few seconds, and cool. Then evaporate excess of ammonia, add other ingredients, and filter. If any carmine deposits on keeping, add one or two drops ammonia to redissolve.

Beale (CARMINE GLYCERIN MASS). Dissolve 5 grains carmine with 5 drops ammonia in little water, and add to 4 fl. dr. glycerin. Then add gradually, with agitation, 4 fl. dr. glycerin, containing 8 to 10 drops acetic or hydrochloric acid. If necessary add more acid to insure decided acidity. Finally add glycerin 4 fl. dr., alcohol 2 fl. dr., and water 6 fl. dr.

Beale (CEMENT). Thick solution of shellac in alcohol. Addition of 20 drops castor oil to each fl. oz. has been recommended.

Beale (CREOSOTE MOUNTING MIXTURE). Dissolve 11 Gm. creosote in 180 Gm. methyl alcohol, add sufficient chalk to make thick paste, then add 1920 Gm. water gradually, constantly stirring, then a few fragments camphor. After standing several weeks, filter.

Beale (DIGESTION FLUID). Dissolve dried mucus from the stomach glands of pig (or, prepared pepsin) in water or glycerin, and keep tissues in solution for some hours at 37° C.

Beale (GLYCERIN JELLY). Soak gelatin or isinglass for 2 or 3 hours in cold water, then remove and melt. Cool, but while still fluid, add a little white of egg, shake well, and heat to boiling-point. Filter through fine flannel to remove coagulated albumin, and to clear solution add equal bulk of glycerin.

Beale (PRUSSIAN-BLUE GLYCERIN MASS). *a.*—Potassium ferrocyanide 12 grains; glycerin, 4 fl. dr.; water, 4 fl. dr. *b.*—Tinct. ferric chloride, 1 fl. dr.; glycerin, 4 fl. dr.; water, 4 fl. dr. Add *b* to *a* very gradually, shaking well after each addition. Then add alcohol, 1 fl. oz., and water, 3 fl. oz., shaking mixture constantly. Preserve injected specimens in acidulated glycerin.

Beale (PRUSSIAN-BLUE GLYCERIN MASS, ACID). *a.*—Potassium ferrocyanide, 3 grains; glycerin, 1 fl. oz. *b.*—Tinct. ferric chloride, 10 drops; glycerin, 1 fl. oz. Add *b* to *a* by

drops, then add water, 1 fl. oz. and strong hydrochloric acid, 3 drops. If desired, add also 2 fl. dr. alcohol.

Bechamps (NITROBENZENE). Essential oil almonds adulterated with nitrobenzene yields blue color on distilling with ferric acetate, and adding chlorinated lime to distillate.

Bechi (COTTONSEED OIL). Warmed with an alcoholic ethereal silver-nitrate solution, cottonseed oil (or colza oil if present) yields reddish-brown color; olive oil and other oils remain uncolored. The Swiss Society for Analytical Chemists in 1895 suggested the following reagent: Dissolve 1 Gm. silver nitrate in 5 Cc. water, 200 Cc. alcohol, 20 Cc. ether, and add 1 Cc. nitric acid, sp. gr. 1.4. To test for cottonseed oil, mix 10 Cc. of fat and 3 Cc. of reagent, and heat on water-bath 10 minutes. If cottonseed oil present, brown or even black color develops. Compare *Millian's* test.

Becker (PICROTOXIN) This reduces Fehling's solution when gently warmed with the latter.

Bedot (FIXING DELICATE PELAGIC ANIMALS). Add suddenly a large quantity of 15- to 20-% cupric-sulphate solution to the sea water containing the animals, and as soon as latter are fixed add few drops nitric acid and leave for 4 or 5 hours. Harden by adding two volumes Flemming's "strong" solution to each volume copper solution, leave for 24 hours, then add few drops of 25-% alcohol, and during next 15 days add more alcohol gradually until strength of 70% attained. Use 90-% alcohol for definite preservation.

Bedson (APOMORPHINE). On boiling morphine solution containing apomorphine with potassuim hydroxide, brown color develops.

Behier (URIC ACID).—See *Babo's* test.

Behren (FATTY OILS). By treatment with a mixture of equal parts of sulphuric acid, sp. gr. 1.835 to 1.84, and nitric acid, sp. gr. 1.3, different oils behave differently. Sesame oil gives green color; olive oil, yellow.

Beilstein (HALOGENS). Chlorine, bromine or iodine may be detected in organic substances by a green or blue color on dipping cupric-oxide beads into suspected substance, and heating in lower part of Bunsen flame.

Beissenhirtz (ANILINE). Solution of aniline in conc. sulphuric

acid acquires, when a grain potassium bichromate is added, first a red, then blue, gradually-disappearing color.

Bela-von Bitto (ALDEHYDES AND KETONES). Fine greenish fluorescence is produced in few minutes on adding to suspected solution a few Cc. of aqueous or alcoholic solution (0.5- to 1-%) of a meta-diamine salt. Fluorescence disappears on adding alkali and reappears on acidulating.

Bela-Haller (MACERATING MIXTURE). Flacial acetic acid, 1; glycerin, 1; water, 2. Cells of central nervous system of mollusca show less shrinkage after macerating 30 to 40 minutes in this than in other liquids.

Bell, Carter (ALUM IN FLOUR OR BREAD). Fresh 5-% logwood tincture in methylated spirit. Moisten 10 Gm. flour with water, then add 1 Cc. tincture and an equal quantity saturated ammonium-carbonate solution. Sample, if pure, gives pinkish color gradually fading to buff or brown. If alum present, a lavender or bluish tint develops, becoming more marked on drying.

Bellamy (COPPER AND IRON). Tincture logwood affords blue color.

Bellonci (NEUROLOGICAL METHOD). Treat material with 0.5- to 1-% osmic-acid solut., hardening for 14 to 24 hours only; cut sections, and treat with 80-% alcohol, then with ammonia.

Benda (COPPER-HEMATOXYLIN). Harden material with chromic-acid or Flemming's solut., leave sections for 24 hours in 5-% neutral copper-acetate solut. at about 40° C., wash well with distilled water, and stain dark-gray or blackish in saturated aqueous hematoxylin. Decolorize sections in 0.2-% hydrochloric acid till light-yellow, put back into copper solut. till bluish-gray, wash, dehydrate, clear, then mount in balsam.

Benda (DOUBLE STAIN). Stain sections 24 hours in aniline-water safranine solut., then about half minute in solut. of 0.5 Gm. Lichtgrün F. S. or Säureviolett (Grübler) in 200 Cc. alcohol. Dehydrate, then mount in balsam.

Benda (IRON-HEMATOXYLIN). Mordant sections 24 hours in following solution diluted with 1 or 2 vol. water: Ferrous sulphate, 80; water, 40; sulphuric acid, 15; nitric acid, 18. Wash well, place in 1-% aqueous hematoxylin until quite black, wash again, and differentiate in 30-% acetic acid.

Benysek (TUBERCLE BACILLI STAIN). Press sputum between two sterilized object-glasses, and expose to air (preferably under a bell-jar) to dry. Avoid heat, otherwise stain less distinct. Now moisten dry sputum with mixture of conc. alcoholic solut. fuchsine, 4; carbolic acid, 5; and water 45, and warm gently over spirit lamp till vapors rise, then wash with water and stain with solut. methylene blue containing 10 per cent. sulphuric acid. Wash again after 4 to 6 minutes and dry. Tubercles are thus stained a dark-red, while rest of specimen is light-blue. Other bacteria not stained by this process.

Bergman (MINERAL ACIDS). If wine or vinegar contains free mineral acid, calcium oxalate is not precipitated on adding 5 drops normal ammonium-oxalate solution, followed by 5 drops normal calcium-sulphate solution.

Bergonzini (STAINING METHOD FOR PLASMA CELLS). Mix 1 vol. of acid-fuchsine solution (0.2-%) with 2 vol. methyl-green solut. (0.2-%) and 2 vol. gold-orange solution (0.2-%), and filter through cotton wool. The gold orange used must not precipitate methyl green. Take sections from alcohol or corrosive-sublimate solut.; wash with water, and stain for 3 to 4 minutes. Then wash with water for 1 or 2 minutes, immerse in absolute alcohol for 2 minutes, clear in bergamot oil or creosote, wash in turpentine, and mount in balsam.

Berkley (MODIFIED WEIGERT'S STAINING METHOD). Harden sections of tissue not thicker than 2.5 Mm. for 24 to 30 hours in Flemming's solut. at 25° C. Then put in absolute alcohol, changed twice during first 24 hours; when sufficiently hardened imbed in celloidin and cut. Wash sections in water, immerse over night in satur. solut. copper acetate (or warm therein at 35° to 40 C. for half hour) then wash, and stain for 15 to 20 minutes in mixture of 2 Cc. satur. solut. lithium carbonate, 5 Cc. boiling water (boil 2 minutes), and 1.5 to 2 Cc. 10-% hematoxylin solution. Warm stain to 40° C.; when sections cool, differentiate for 1 to 3 minutes in Weigert's ferricyanide liquid, diluted if necessary with one-third water. Then treat with water, alcohol, and bergamot oil, and mount in xylol balsam.

Berlin (URIC ACID). See *Babo*.

Berlinerblau (REGENERATING WEIGERT'S HEMATOXYLIN). Add 2.5 to 5% baryta water to used solution, shake well, and leave for 24 hours. Then pass in carbon dioxide, let stand 24 hours and filter.

Bernouilly (ALCOHOL). Essential oils adulterated with alcohol form dense solutions on adding dry potassium acetate. Compare *Barbier's* test.

Berthelot (ALCOHOL). Shake dilute solution of alcohol with few drops benzoyl chloride and soda-solution until odor of benzoyl chloride disappears—characteristic odor of ethyl benzoate develops.

Berthelot (PHENOL). Add a little sodium hypochlorite or solution chlorinated lime to slightly ammoniacal liquid (urine) and warm—blue color develops if phenol present. Acid changes color to red, and ammonia subsequently added restores original blue. Compare *Bodde*, *Jacquemin*, *Lee*, and *Salkowski*.

Bertoni-Raymondi (NITROUS ACID IN BLOOD). Dialyse, evaporate dialysate to dryness, take up with hot alcohol, and add starch paste and potass. iodide—blue color develops.

Bertrand (ALKALOIDS). Silicotungstic acid, or a 5-per cent. solution of one of its salts, gives precipitates with alkaloids. Reaction very delicate. Many precipitates give with oxidizers characteristic color reactions.

Bertrand (URIC-ACID ESTIMATION). Add $AgNO_3$ to liquid containing uric acid in presence of an alkaline carbonate, collect pptd. silver, wash out any soluble silver salt present, treat with NH_3, and weigh residual metallic silver. 0.001 Gm. uric acid = 0.001235 Gm. Ag.

Berzelius (ALBUMIN). Fresh, conc. metaphosphoric-acid solution precipitates all albuminous substances (except peptone) from their aqueous solutions.

Berzelius (ARSENIC). Mirror is formed and alliaceous odor given off on heating arsenic in test-tube with charcoal.

Berzelius (BROMIDES). Heat fragment with a bead of salt of phosphorus containing cupric oxide in blowpipe flame—latter acquires bluish-green color.

Berzelius (MUSK). Aqueous infusion of pure musk should not precipitate solution mercuric chloride.

Betelli (FUSEL OIL). Mix alcohol, 5 Cc.; water, 6 Cc.; chloroform, 15 drops. Shake well, and on standing, fusel oil in alcohol can be detected on evaporating separated chloroform.

Bethe (METHYLENE-BLUE METHOD). Stain tissues of vertebrates and rinse in salt solution, place for 2 to 5 hours, according to size, in solut. of ammonium molybdate, 1 Gm.; water, 10 Gm.; hydrogen dioxide, 1 Gm. (For invertebrates use ammonium molybdate, 1 Gm.; water, 10 Cc.; hydrogen dioxide, 0.5 Cc.) This should be not more than 8 days old, and is best cooled to 0° C. Subsequently wash in water for 0.5 to 2 hours, dehydrate in alcohol at 0° C., clear in clove oil or xylene, and imbed in paraffin or celloidin in the usual way.

Bethe (STAIN FOR CHITIN). Place series of mounted sections on slides in fresh 10-% aniline-hydrochlorate solut. (containing 1 drop hydrochloric acid in each 10 Cc.) for 3 or 4 minutes, then rinse in water, and put slide with sections downwards in 10-% potassium-bichromate solut. Repeat process if stain not sufficiently intense, but sections must be well rinsed with water after each immersion.

Bettendorf (ARSENIC). Heat solution of stannous chloride in conc. hydrochloric acid sp. gr. 1.19, with solution of arsenic or arsenous acids in strong hydrochloric acid. Brownish turbidity or precipitate of metallic arsenic and tin results. Presence of much sulphuric acid, or of oxidizing or organic substances, interferes with reaction.

Betz (AMMONIA CARMINE). Make thick syrupy mass by rubbing up commercial carmine with water and ammonia, with continual stirring, to effect solution. Add large quantity of water, after which filter solution and expose to sun in uncorked green glass bottle until precipitate is deposited. Expose again, then filter, and repeat operation a third time. When no further precipitate deposited, the stain is ready for use.

Betz (HARDENING FLUID). Mixture of equal parts sulphuric ether and alcohol. Used for hardening brain of insects prior to cutting sections.

Bial (PENTOSE; GLYCURONIC ACID). The reagent is prepared from 1 to 1.5 Gm. orcine, 500 Gm. fuming HCl, and 25 to 30 drops 1-% solut. Fe_2Cl_6. On heating urine with the reagent

until bubbles begin to rise, a fine green color develops. Glycuronic acid also gives the reaction, but much more Fe_2Cl_6 is required. In this case employ a pinch of orcine to 2 or 3 Cc. of urine, and 4 to 5 Cc. fuming HCl, and add 1 to 2 drops 10-% solut. Fe_2Cl_6.

Bianco (CHROMO-ACETIC ACID). Add to concentrated acetic acid one-tenth its bulk of 1-% chromic-acid solution.

Bianco (NARCOTISING MIXTURE FOR ACTINIÆ, ETC.). Glycerin, 20; alcohol (70-%), 40; sea water, 40. Pour carefully on surface of water containing the animals, and allow to diffuse quietly through it. Several hours may be necessary for this.

Bickfalri (DIGESTION FLUID). Mix 1 Gm. dried stomach mucus with 20 Cc. of hydrochloric acid (0.5-%), and put into incubator for 3 or 4 hours, then filter. Macerate tissue in this ½ to 1 hour.

Bieber (FIXED OILS). 5 vol. of a fixed oil with 1 vol. of a mixture of equal weights conc. sulphuric acid, fuming nitric acid and water. Color reaction occurs, varying with kind of oil.

Bieber (PEACH KERNEL AND ALMOND OILS). With Bieber's reagent for fixed oils, peach-kernel oil gives deep orange color, while true almond oil forms yellowish zone.

Biel (BENZENE AND BENZIN). These differ in behavior to iodine (color), alcohol (solubility), asphalt (solubility), nitric acid (nitrobenzene), and specific gravity.

Biel (COCAINE TEST). Heat solution of 0.1 Gm. of a cocaine salt in 1 Cc. conc. sulphuric acid for several minutes on water-bath, and add several Cc. water. White, crystalline precipitate of benzoic acid forms.

Bill (BROMIDES). Mixture of 1 drop each hydrochloric acid and gold-chloride solution with a bromide gives a yellow to dark orange-red color.

Bill-Seligsohn (CINCHONINE). Acid salts of cinchonine (even in urine) give an amorphous precipitate with potassium ferrocyanide, soluble on heating, but reprecipitated on cooling in form of acicular prisms.

Biltz (IODIC ACID). Iodic acid in nitric acid gives blue color on diluting acid with equal vol. water, adding few drops starch solution, and then few drops sulphuretted-hydrogen water.

Biltz (SODIUM CARBONATES). Aqueous solut. pure sodium bicarbonate (1:15) gives white cloudiness when one-sixth its volume of aqueous solution mercuric chloride (1:20) added. If monocarbonate present, brownish-red precipitate falls.

Binz (CARBON MONOXIDE IN BLOOD). Saturated, warm (40° C.) solut. tannic acid.

Binz (QUININE IN URINE). Reagent consists of 2 parts iodine, 1 part potassium iodide, and 40 parts water. 1 Gm. quinine in 40 to 50 liters urine detected.

Biondi (STAIN). See *Ehrlich-Biondi.*

Bird (SULPHUR COMPOUNDS IN PETROLEUM). Prepare solut. of sodium plumbate by dissolving 1.5 dr. caustic soda in distilled water to make 10 fl. drs., heating to boiling point, and while boiling adding litharge to saturation. Decant clear liquid from undissolved litharge. Shake well 1 fl. dr. of white petroleum oil to be examined, with 30 min. absolute alcohol, add 2 drops test solution, shake again for few seconds, and let stand for half hour. According to amount of sulphur present, the mixture assumes tint varying from deep orange with much sulphur, through orange and yellow to very pale yellow with traces only.

Bischoff (BILIARY ACIDS). Heated with diluted sulphuric acid and cane sugar these yield red color. See also *Pettenkofer* and *Strassburg.*

Bischoff (MELTING-POINT TEST FOR BUTTER). See *Drouot's test.*

Bitto (ALCOHOLS, MONATOMIC). Methyl violet 0.5 Gm., water 1 liter. Shake 1 to 2 Cc. of this solution with 5 to 10 Cc. of the fluid to be tested and 0.5 to 1 Cc. potassium-sulphide solut.—a monatomic alcohol develops a cherry-red to violet-red color. If no alcohols present, mixture becomes greenish-blue, precipitates reddish flocks, and finally appears yellow. Di- and poly-atomic alcohols, carbohydrates, acids, aromatic compounds, and phenols do not give the reaction.

Bitto, von-Bela.—See *Bela-von Bitto.*

Bizzari-Bruno.—See *Bruno-Bizzari.*

Bizzozero (GENTIAN-VIOLET METHOD). Stain in Ehrlich's gentian-violet solut. for 5 or 10 minutes or longer; wash in alcohol

5 seconds; in Gram's iodine solut. 2 minutes; alcohol 20 seconds; aqueous chromic-acid solut. (0.1-%) 30 seconds; alcohol 15 seconds; chromic-acid again 30 seconds; and alcohol 30 seconds. Afterwards treat with changes of clove oil until final decoloration, and mount in dammar. In another process by Bizzozero, treatment with iodine solution is omitted.

Bjeloussow (ACACIA INJECTION MASS). Mix syrupy solut. acacia and saturated aqueous solut. borax, so as to have in the mixture 1 part borax to 2 parts gum. Add distilled water gradually to resulting mass, then force through fine-grained cloth, and repeat operation until a mass free from suspended gelatinous clots obtained.

Björklund (CACAO BUTTER). 3 Gm. cacao butter should give a clear solution with 6 Gm. ether at 18° C. (otherwise wax present). Dip test-tube in water at 0° C.; a cloudiness within 10-15 minutes indicates presence of foreign fats.

Blachez (ALCOHOL). Alcohol in chloroform gives precipitate on adding small piece potassium hydroxide, agitating, pouring off chloroform after standing five minutes, shaking with equal volume water, then decanting latter and adding solut. copper sulphate.

Blaise (QUININE). See *Vogel's* reaction.

Blanc (FIXING INFUSORIA). For larvæ of Echinodermata, Medusæ, and Porifera, mix saturated solut. picric acid, 100; sulphuric acid, 2; water, 600. For Rhizopoda and Infusoria, add 2 to 3 drops of 1-% acetic acid to every 15 Cc. of above mixture. Wash out with 80-% alcohol, followed by 90-%, and absolute alcohol; then stain with tincture saffron (saffron, 5 Gm.; absolute alcohol, 15 Cc.), wash out with 80-% alcohol, and pass through absolute alcohol into clove oil.

Blanchard (STAINING BACTERIA). Treat cover-glass preparation with osmic acid, placed in position on slide, and run under a drop of methyl-violet solut. After half an hour, complete preparation by running in glycerin or saturated calcium-chloride solut. tinted with methyl violet. If hematoxylin used as stain, it should be allowed to act 24 hours, and the preparation must then be washed repeatedly before mounting.

Blarez (ANILINE COLORS). Shake 20 Cc. wine with 5 Gm.

lead peroxide for one minute; color due to natural coloring matter disappears, but aniline colors unaffected.

Bloxam (ALKALOIDS). Distinctive color reactions are given by various alkaloids on dissolving in dilute hydrochloric acid and adding bromine water drop by drop.

Bloxham (UREA). If a nitrate present add few drops ammonium chloride solution; if absent acidulate with hydrochloric acid. Evaporate to dryness in watch-glass and heat cautiously as long as thick white fumes evolved. Dissolve residue in a drop or two ammonia, add a drop barium chloride solut. and stir. If urea present crystalline streaks of barium cyanurate will form in track of the rod.

Blum (ALBUMIN). Dissolve 0.03 to 0.05 Gm. manganous chloride in little water acidulated with hydrochloric acid and treat with 100 Cc. 10-% solut. sodium metaphosphate. Then add lead dioxide a little at a time, let liquid settle, and filter. Resulting pink solution of manganic metaphosphate detects albumin in urine. Place reagent in a test-tube and filter urine into it.

Blum (HARDENING SOLUTION). Formaldehyde diluted with 10 vol. water.

Blyth (LEAD). Lead in potable water precipitates coloring matter on adding tincture cochineal (1-%).

Boas (HYDROCHLORIC ACID). Solut. 1 Gm. resorcin and 3 Gm. cane sugar in 100 Gm. alcohol (50-%) gives red color on adding one drop to a solution containing free hydrochloric acid, and evaporating to dryness. Compare *Conrady's* test.

Boas (LACTIC ACID). Test for lactic acid in gastric juice depends on oxidation of the acid to aldehyde and formic acid by action of sulphuric acid and manganese. The aldehyde detected by addition of Nessler's reagent or by formation of iodoform when iodine solution added. This test for lactic acid more delicate than that of *Uffelmann*, (q. v.).

Boas (REAGENT). Tropæolin solution, or paper saturated with such solution.

Boas (TEST PAPER). Tropæolin Paper. Paper impregnated with tropæolin OO gives with alkalies a yellow, with acids a red, color. Also known as Lutke's paper.

Bobierre (LEAD). Lead in tin gives yellow stain on applying a

drop glacial acetic acid, heating, and adding a drop potassium-iodide solution (5-%).

Boccardi (SOLUTION). 1.—Oxalic-acid solut. (0.1- to 0.3-%). 2.—Formic acid, 5 Cc.; oxalic-acid solut. (1-%), 1 Cc.; water, 25 Cc.

Bodde (DIFFERENTIATING RESORCIN AND PHENOL, BENZOIC AND SALICYLIC ACIDS). Resorcin solut. yields violet color with sodium hypochlorite, changing to yellow; with more hypochlorite and heat, a yellowish-red to brown. If ammonia added before addition of hypochlorite, a violet first ensues, changing to yellow, and, on boiling, liquid becomes dark green.

Phenol, salicylic acid, and benzoic acid yield a slight color with hypochlorite only on heating. On previous addition of ammonia the carbon acids are not colored, but phenyl yields a greenish-blue.

Boedecker (ALBUMIN). With albumin (*e. g.*, in urine) acidulated with acetic acid, potassium ferrocyanide causes turbidity or flocculent precipitate.

Boedecker (SULPHITES). Sulphites in neutral liquids give with zinc-sulphate solut. and little sodium nitroprusside, a rose to dark-red color. Potassium ferrocyanide gives purple precipitate.

Boehm (BOMBAY MACE). Filter alcoholic extract of Bombay mace through pure white filter-paper—paper only stained pale-yellow color, and when dried, red color of Bombay mace appears round the edge.

Boehmer (HEMATOXYLIN). 1.—Add 2 or 3 drops 1-% hematoxylin solut. in absolute alcohol to a watch-glassful of aqueous solut. alum (0.5-%), leave sections in the mixture half to 1 day, then pass in succession through absolute alcohol, alcohol solut., tartaric acid, absolute alcohol again, then through benzene or turpentine. Finally mount in castor oil. 2.—Dissolve (*a*) crystallized hematoxylin, 1 Gm., in absolute alcohol, 10 Cc., and (*b*) ammonia alum, 10 Gm., in distilled water, 200 Cc. Mix and allow to ripen some days before use. Filter after standing a week. Wash out with aqueous alum solut. (0.5-%) or with acids.

Boehn (NEUTRAL CARMINE). Triturate 3 or 4 Gm. carmine

and 200 Gm. of water; add ammonia drop by drop, until the solution acquires a cherry-red color. Then add acetic acid until solution sealing-wax red in color and filter. To intensify color add 2 drops ammonia before filtering, and expose in open vessel until odor of ammonia gone. Stain tissues in this for 24 hours (or longer if more than 1 Mm. thick), after which wash out with mixture of equal parts glycerin and water, acidulated with 0.5-% hydrochloric acid.

Boernstein (SACCHARIN). Extract substance with ether, and heat extract, after ether removed by distillation, with resorcin and sulphuric acid, and add excess of soda solution. If saccharin present, a strong fluorescence develops. According to Hooker, other substances, *e. g.*, succinic acid, also give this reaction.

Boettger (ALCOHOL). Alcohol gives blue color with solut. molybdic acid in sulphuric acid. Alcohol present in essential oils can be removed by shaking with glycerin. Or, a piece of dry potassium hydroxide added to the oil is soon covered with a yellowish film.

Boettger (AMMONIA). Gaseous ammonia changes the color of alkanin paper from red to blue.

Boettger (ANIMAL FIBER). Treat fabric with alcoholic solution rosolic acid, then with soda solution, and wash. Animal fibers (as wool) are dyed red, linen (flax) pink, but cotton remains uncolored. Compare with *Liebermann's* test.

Boettger (CARBON MONOXIDE [COAL GAS]). Fabrics impregnated with a palladium-chloride solut. are rapidly blackened on exposure to coal gas. Ethylene, methane, and hydrogen sulphide afford a similar reaction.

Boettger (COLORING MATTERS OF RED WINE). Mix 1 vol. conc. copper-sulphate solut. with 3 vol. wine diluted to ten times its volume. Pure red wine is thereby discolored. Unfermented wine, as well as coloring matter of huckleberries, malva, and cherries, and fuchsine, remain unchanged or are colored violet.

Boettger (COTTON AND LINEN FIBERS). Dye fabric with fuchsine solution, wash out with water, then treat with ammonia. Cotton is decolorized; flax retains the dye. See *Liebermann's* test.

Boettger (ERGOT IN RYE-FLOUR). Heat several minutes with equal bulk ether and few crystals of oxalic acid—reddish color develops.

Boettger (FLOUR IN STARCH). Flour in starch gives more or less persistent foam on boiling 1 Gm. of the mixture with 180 Cc. water, and stirring briskly with a glass rod.

Boettger (GLUCOSE). Boil dilute glucose solution (or diabetic urine) with sodium-carbonate solut. and some bismuth subnitrate or bismuth oxyhydrate. Reduction causes blackening of suspended bismuth. According to *Krueger*, a stable reagent can be prepared by heating 15 Gm. bismuth nitrate, 15 Gm. tartaric acid, 75 Gm. water, sufficient potassa lye to effect solution, and some glycerin.

Boettger (HYDROGEN DIOXIDE). 1.—To a solution containing hydrogen dioxide add some cadmium-iodide, and starch-paste, containing also a little ferrous sulphate; blue color (starch iodide) develops. (Also known as *Schoenbein's* reagent.) 2.—Heat liquid containing hydrogen dioxide with few drops ammoniated silver-nitrate solut. containing no free ammonia; cloudiness caused and silver is reduced.

Boettger (INDICATOR). Color of tincture *Coleus verschaffelti* is changed from red to green on adding to an alkaline solution.

Boettger (MANGANESE). Red color develops on throwing a little manganese into fused potassium chlorate.

Boettger (NITRIC ACID). Nitric acid in potable water gives a red to brownish-red color on mixing 3 drops of the water, with two drops brucine solution, and 3 or 4 drops sulphuric acid.

Boettger (NITROUS ACID). Nitrous acid gives blue color on adding diluted sulphuric acid and cadmium-iodide starch paste. See *Boettger's* reagent.

Boettger (OZONE). Filter-paper saturated with gold-chloride solution, free from acid, is colored violet by ozone. A test-paper formerly suggested by *Boettger* contained thallium hydroxide, which was colored brown by ozone.

Boettger (REAGENT). Solution of cadmium iodide and starch. Dissolve starch, 1, in water, 200, and hydrochloric acid, 1. Neutralize with calcium carbonate, 10; then add sodium

chloride, 10; and cadmium chloride, 0.5, and make up to 250 with water.

Boettger (SAFRANINE). With sulphuric acid safranine turns blue, and subsequent addition of water changes color to green.

Boettger (STAINING METHOD). Treated preparations with Muller's fluid, then alcohol, then stain with rosaniline nitrate dissolved in glycerin and water, wash out with alcohol, clear with creosote or clove oil, and finally mount in balsam.

Boettger (SUGAR IN GLYCERIN). Heat 5 drops glycerin to boiling with 100 drops water, 1 drop nitric acid, sp. gr. 1.3, and 0.03 to 0.04 Gm. ammonium molybdate. Sugar colors solution intensely blue.

Boettger (SULPHOCYANIDES). Filtering paper dipped in tincture guaiac and dried, then moistened with copper-sulphate solution (1:2,000), is colored blue by sulphocyanides in solution.

Boettger (TEST-PAPER). 1.—Anchusin Paper. Gives with alkalies a green to blue color; with acids a red. 2.—Colein Paper. Gives with alkalies a yellow color, and with acids a red.

Boettger (WATER IN ETHER). Ether containing water causes a milky appearance on shaking gently with an equal bulk carbon bisulphide.

Bogomolow-Wassilieff (ALBUMIN AND PEPTONES). 1.—Carminic acid precipitates albumin (either egg or in urine) even in very dilute solutions (1:9,000). Also precipitates proteo-albumoses and deutero-albumoses. The latter change color of carminic-acid solut. (33-per cent. aqueous) to black, and precipitate does not dissolve on boiling; former simply darken it, and the ppt. dissolves on boiling. Albumoses insol. in water give reddish-violet color with carminic-acid solut. 2.—Precipitate any accompanying albuminoids with trichloracetic acid. Peptone revealed in filtrate by biuret reaction. See *Devoto's* reaction for peptone.

Bohland (URINARY DEPOSITS). To preserve urinary deposits, decant supernatant urine, wash residue with physiological salt solution (sodium chloride, 4; sodium carbonate, 3; water, 1,000), then treat with Müller's solution, renewing this 3 or 4

times in 14 days. Finally harden with alcohol, frequently renewed until colorless.

Bohlig (AMMONIA). *a.*—Mercuric chloride, 1; water, 30. *b.*—Potassium carbonate, 1; water, 50. Free ammonia and its carbonate cause white turbidity with solution *a*. If reaction is first induced on addition of solution *b*, the ammonia is combined with other acids.

Bolas (NITRIC ACID). Mix 10 parts sulphuric acid with 1 of ferrous-sulphate solution, heat, and carefully overlay on suspected liquid. Nitric acid causes brown zone.

Bollet (CASTOR OIL). Heat 10 Gm. of the oil with 6 Gm. alcohol solut. silver nitrate (silver nitrate, 5 Gm.; nitric acid, 1 Gm.; alcohol, 100 Gm.) five minutes on a water-bath after thorough mixing—if cottonseed oil present a reddish color develops.

Bolley (BUTTER). Butter exposed to sunlight in contact with a moistened strip of blue litmus paper reddens the latter; artificial butter does not.

Bolton (INDICATOR). Polysulphide solution—a very conc. solut. of sublimed sulphur in a solut. of an alkaline sulphide. Gives with alkalies no ppt.; with acids, however, a turbidity (pptd. sulphur).

Bonastre (MYRRH). Saturate strips of filter-paper with tincture myrrh, dry, and wet with a drop nitric acid. Genuine myrrh causes a violet color.

Borme (MACERATION FLUID). Mix 10-% sodium-chloride solution, 5, with absolute alcohol, 1.

Born-Wieger (QUINCE MUCILAGE). Mix 2 vol. quince mucilage and 1 vol. glycerin and add trace of carbolic acid. Used to fix serial sections to slides, gentle heat being applied for that purpose.

Bornstein (SACCHARIN). Extract substance with ether, distil off solvent, and heat residue with resorcin and concentrated sulphuric acid. Saccharin produces a marked fluorescence on saturating with caustic soda.

Borntraeger (ALOE REACTION). Shake alcoholic extract aloes with benzin. To benzin solution, after separation from alcoholic layer, add small amount strong ammonia water, and gently heat while shaking. Aloes (also other substances,

such as rhubarb, curcuma, galls, catechu) effect a violet coloration of ammoniacal solution.

Borntraeger (INDICATOR). Concentrated tincture of fresh orange peel, shaken with ether, is not affected by acids, but turns lemon-yellow with alkalies.

Borodin (SOLUBLE PRECIPITATES). Process consists in treating precipitate with a saturated solution of the body with which it is supposed to be identical. *E. g.*, a vegetable microscopical preparation, containing a substance, suspected to be asparagin, is treated with a saturated solution of that body. If it be asparagin, it will be insoluble; if not, it will probably be dissolved.

Borsarelli (ALCOHOL). Heat essential oils containing alcohol with dry calcium chloride—a dense solution is formed.

Bouchardat (ALBUMIN). 3.32 Gm. potassium iodide, 1.35 Gm. mercuric chloride, 20 Cc. acetic acid, and water to make 60 Cc. Solut. precipitates albumin in urine. Also precipitates uric acid, mucin, and alkaloids. Uric-acid ppt. more soluble, especially on heating, hence test in well diluted urine. Mucin ppt. is light and cloudy—albumin ppt. is flocculent. Alkaloid ppt. soluble on warming and in alcohol.

Bouchardat (ALKALOIDAL REAGENT). Dissolve 10 Gm. iodine and 20 Gm. potassium iodide in 500 Gm. water. With aqueous solution of most alkaloids reagent yields reddish-brown precipitates.

Boudart (DIFFERENTIATING FATTY OILS). Mix oils with nitric acid, sp. gr. 1.45 to 1.50. A carmine-red coloration gradually produced by genuine cod-liver oil.

Boudet (OLIVE OIL). Note color produced on adding 3 parts of mixture of equal volumes sulphuric and nitric acids to 10 parts of the oil; and solidification caused by addition of 5-% fuming nitric acid to oil.

Bougault (ARSENIC IN GLYCERIN). Dissolve 20 Gm. of sodium hypophosphite in 20 Cc. of water, add 200 Cc. of conc. HCl (sp. gr. 1.17), filter through cotton, and mix 10 Cc. reagent with 5 Cc. glycerin to be tested. On now heating the mixture on a water-bath, a flocculent brown ppt. or dark-brown color develops if but 0.0001 Gm. arsenous acid is

present. Even 0.00002 Gm. still gives a distinct brown color, while 0.00001 may still be detected.

Bourget (IODIDES IN URINE AND SALIVA). Impregnate filter-paper with a 5-per cent. starch solut., dry, and cut into squares of 5 Cm. each. Then drop 2 or 3 drops of a 5-per cent. ammonium-persulphate solut. in the center of each square, and dry pieces in the dark. Prepared paper gives even with traces of iodine an intensely blue color. Reaction visible in solution containing 0.00005 per cent. KI.

Bourgoin (NITROBENZENE). Shake 15 drops essential oil bitter almonds with 8 drops potassa solut.; green color develops if nitrobenzene present; on subsequently adding 20 drops water two layers form—the upper green, the lower yellow.

Bourne (BORAX CARMINE). Mix saturated solution of carmine in 4-% borax solution with equal volume of 70-% alcohol. Let mixture stand a week, then filter; if carmine deposited subsequently, filter again. Leave tissues in this stain for 1 to 3 days, according to size, then immerse in acidulated alcohol for 3 to 6 hours until bright and transparent.

Bourreau (ALBUMIN). See *Roch's* reagent.

Boussingault (NITRIC ACID). Depends on decolorization of indigo solution in sulphuric acid in presence of hydrochloric acid. Heat a little of the latter in test-tube, add a few drops of very dilute indigo-sulphate solution, then the substance to be tested. Nitric acid discharges blue color.

Boutmy-Brouardel. See *Brouardel-Boutmy.*

Bouvier (AMYLIC ALCOHOL). Alcohol containing fusel oil acquires a yellowish color on adding a few crystals potassium iodide and agitating gently.

Braconnot (ARSENIC). Extract arsenic with alcohol and test with sulphuretted hydrogen.

Bradford (OLIVE OIL). Reddish color on shaking olive oil with solution of lead subacetate indicates presence of cotton-seed oil.

Brady (CHLORAL-HYDRATE MEDIUM). Strong, aqueous chloral-hydrate solution.

Braeutigam-Edelmann (HORSE MEAT). Boil 50 Gm. of meat to be tested with 200 Gm. water for 1 hour. Evaporate filtered broth to one-half its volume, remove albumin by means

of dilute nitric acid, and add iodine water to form a layer. Horse meat, on account of its large percentage of glycogen, causes a burgundy-red zone. Starch and dextrin interfere with the reaction, the former giving a blue, the latter a red color.

Brand (ABRASTOL IN WINE). Treat wine first with lead peroxide and sulphuric acid to eliminate other coloring matter, then shake out with chloroform, and evaporate solvent; abrastol is left and may be identified by green color reaction with sulphuric acid.

Brand (FLUORINE IN BEER). Modification of Nivière's test (q. v.). Convert fluorine in the precipitate into hydrofluoric acid by adding sulphuric acid; then identify by its etching properties. For details see "Zeitschr. f. d. ges. Brauwesen," 1895, p. 317.

Brand (THALLEIOQUIN REACTION). 1.—Triturate salts of quinine or quinidine with a little chlorine water, and add ammonia; green color develops. If to solution of alkaloids, after addition of a slight excess of chlorine water, ammonia water is added drop by drop, a green, flocculent precipitate forms, soluble with green color in excess of ammonia water.

2.—*Hyde's* modification consists in acidulating a quinine solution containing 5 Mg. of the alkaloid, with one drop sulphuric acid (1:4), passing through a small filter and adding chlorinated-lime solution until bluish fluorescence first visible is destroyed. A few drops dilute ammonia (1:3) are now added; if quinine present, a bright green color develops, changed by dilute sulphuric acid to red.

Brandberg (BENZENE; BENZIN). Pitch dissolves in benzene, but not in petroleum spirit.

Brandt (GLYCERIN JELLY). Soak 2 parts gelatin in water, till soft, then drain, melt, add 3 parts glycerin, and filter.

Branson (ASSAY OF GOLD CHLORIDE). Dissolve 15 grains of the salt in water, add 25 Cc. of normal oxalic acid solut., set aside for 36 hours at about 21° C. and expose to light for 12 hours, then boil, collect precipitate, dry, incinerate and weigh the metallic gold.

Brantlecht (POTABLE WATER). To detect organic impurities in potable water, treat 100 Cc. with 5 drops aluminium-sul-

phate solution (aluminium sulphate, 1; hydrochloric acid, 1; water, 8), and add 1 or 2 drops ammonia. Filter off precipitate, dissolve it in 10 or 15 drops diluted acetic acid, and examine under the microscope before and after addition of safranine.

Brass (ALCOHOLIC CARMINE). 70-% alcohol, 100 Cc.; hydrochloric acid, 15 drops; carmine, an excess.

Braun (CHLORATES). Chlorates yield cherry-red color on adding solution of aniline sulphate containing toluidin and hydrochloric acid. On neutralizing, color changes to blue.

Braun (GLUCOSE). Glucose solution heated with a few drops picric-acid solution (1:250) gives a deep red color. Creatinine gives a similar reaction with picric acid, and so does acetone, but weaker color.

Braun (MOLYBDIC ACID). Aqueous solution potassium ethylsulpho-carbonate gives a yellow to flesh-colored precipitate, which soon becomes violet, on adding to a very dilute solution of molybdic acid containing a little nitric acid.

Braun (NICKEL). A rose-red to deep brownish red color, almost black, results on adding solution of potassium sulphocarbonate to a solution containing nickel.

Braun (NITRIC ACID). 1.—Addition of first a small quantity aniline sulphate, then conc. sulphuric acid, to solution of a nitrate (or of free nitric acid) produces violet-blue color. 2.—Add to 1 Cc. sulphuric acid, drop by drop, 0.5 Cc. aniline-sulphate solution (10 drops aniline and 50 Cc. diluted sulphuric acid). Place some reagent on a porcelain plate and draw through it a glass rod dipped in suspected liquid. Nitric acid present causes a reddish fringe on breathing upon surface of the mixture.

Breinl (SESAME OIL). HCl and aldehydes of aromatic series give various color reactions. Shake 10 Cc. oil for half minute with 0.1 Cc. aldehyde solut. and 10 Cc. conc. HCl—with benzoic aldehyde an orange color forms; with vanillin, piperonal, or orthoxybenzoic aldehyde a reddish-violet color develops, even in solut. containing 0.5-% oil.

Bremer (GLUCOSE IN BLOOD). Mix equal volumes saturated solutions eosin and methylene blue, collect precipitate, dry, finely powder, and mix with 1-24th its weight of eosin and

1-6th of methylene blue. When required for use 0.02 to 0.05 Gm. of mixture are dissolved in alcohol (33-%), 10 Gm. Immerse a cover-glass with a drop of the blood to be examined in solution for 4 minutes. Glucose causes a blue-black color.

Bremer (GLUCOSE IN URINE). Introduce 10 Cc. normal and diabetic urine respectively into two test-tubes, and place a small pinch of Gentian Violet B, Merck, on surface of liquid in each tube so as to avoid having any of the powder touch the side of the tubes. In normal urine the violet floats on the surface and gives off little clouds and threads which disappear on slight agitation, fine particles falling to the bottom. Diabetic urine is colored in a few seconds, from surface downwards, a blue or bluish-violet, permanent on agitation. The more sugar present, the deeper the color. If methylene blue is used, normal urine is colored green; diabetic urine blue.

Bremer (SESAME OIL). To a cooled mixture of 50 Cc. absolute alcohol and sulphuric acid add 10 drops furfurol. When one drop of reagent is stirred with sesame oil (or with margarine containing it) a red color develops in 1 or 2 minutes. Pure butter and albuminoids are not colored. Compare *Villavecchia* and *Fabri's* reagent.

Bretet (DIFFERENTIATING GLUCOSE FROM SACCHAROSE OR LEVULOSE IN URINE). Precipitate obtained by interrupted boiling with Fehling's solut. readily and rapidly settles; that afforded by saccharose or levulose acquires a yellowish to red-brown color, and remains suspended for a long time.

Brieger (PYROCATECHIN). Add one drop of urine to 1 drop very dilute ferric-chloride solut. on watch-glass — pyrocatechin causes an emerald-green color; on adding now a dilute solut. sodium bicarbonate, or ammonium carbonate, fluid becomes violet, changing back to green with acetic acid.

Brieger (STRYCHNINE). Pure chromic acid gives a violet color with strychnine.

Brissemoret (ALKALOIDS OF OPIUM). With Keller's reagent (conc. H_2SO_4 containing a trace of Fe); with conc. H_2SO_4 containing a trace of NO; and with pure H_2SO_4, various color reactions are obtained. For details of the reactions see MERCK'S REPORT, IX, p. 322.

Bristol (REGENERATING OSMIC-ACID SOLUTIONS). Add 10 to

20 drops fresh hydrogen dioxide solution to each 100 Cc. of 1-% osmic-acid solut.

Brosicke (STAINING METHOD). Treat tissues with 1-% osmic-acid solut. for 1 hour, then wash out carefully and immerse for 24 hours in cold saturated aqueous oxalic-acid solution. Tissues should not be allowed to blacken in the osmic-acid bath.

Brouardel-Boutmy (DIFFERENTIATING PTOMAINES AND PLANT ALKALOIDS). 1.—With potassium ferrocyanide and ferric chloride ptomaines produce a blue color. 2.—Characters are written with a quill on silver-bromide paper, using solution of the alkaloid or ptomaine. The paper, after laying aside for half-hour, protected from light, is developed with hyposulphite. Ptomaines yield black characters; plant alkaloids do not. (Morphine also yields reaction 1.—compare *Kieffer's* reaction—in fact none of the above reactions, depending on reducing properties of ptomaines, can be considered characteristic.)

Brown (COPPER). Treat copper salt in solution with excess of potassium iodide—cuprous iodide precipitated. The iodine in latter determined with standard solution sodium thiosulphate.

Bruecke (BERLIN-BLUE INJECTION MASS). Wash precipitate resulting on adding aqueous solut. of ferric chloride (5-%) to aqueous solut. potassium ferrocyanide (10-%) till water begins to run off blue, then dry. Or, mix 10-% ferric-chloride solut. and 20-% potassium ferrocyanide separately with twice their volume of a cold saturated solut. sodium sulphate, then mix as before. In either case a conc. solut. is made of the washed and dried Berlin blue, and just sufficient gelatin added to form a jelly when cold. The injection should be used at 60° C., and injected material must be hardened in 94-% alcohol. Clear sections with resinous turpentine, prepared by exposure to air in large vessels, stain with carmine if desired, and avoid glycerin for mounting.

Bruecke (BILIARY PIGMENTS IN URINE). Boil with diluted nitric acid, then add conc. sulphuric acid—a green color changing to blue develops. Detects bile if 7.5 per cent. of latter present. See *Gmelin's* test.

Bruecke (BIURET REACTION FOR ALBUMINOIDS). Coagulated albumin acquires a handsome violet color when treated first with diluted copper-sulphate solut., then, after the excess is removed, with dilute soda solution. Comp. *Rose's* biuret reaction.

Bruecke (DIGESTION FLUID). Glycerinated extract pig's stomach, 1 vol.; hydrochloric acid (0.2-%), 3 vol.; thymol, a few crystals.

Bruecke (GLUCOSE). Boil 5.5 Gm. freshly precipitated, moist bismuth subnitrate for 10 minutes with a solut. 30 Gm. potassium iodide in 100 Gm. water, then add 5 Gm. (25-%) hydrochloric acid. Glucose (diabetic urine) effects reduction and causes a brown or black color.

Bruecke (PROTEIDS). Saturate boiling 10-% potassium-iodide solution with freshly precipitated mercuric iodide, and filter when cold; in solutions acidulated with hydrochloric acid, proteids are precipitated on the addition of reagent. Compare *Tanret's* reagent and *Oliver's* test-paper.

Bruecke (RED INJECTION FLUID). A concentrated solut. potassium ferrocyanide is followed by a similar solution of copper sulphate.

Bruecke (UREA). Crystalline deposit obtained on heating alcoholic extract with a little amylic alcohol, filtering and adding solution of oxalic acid in amylic alcohol.

Brulle (FOREIGN OILS [COTTONSEED OIL] IN OLIVE OIL). Boil 10 Cc. of the oil with 0.1 Gm. powdered albumin and 20 Cc. nitric acid. When albumin is dissolved, pure oil is almost colorless, and, on cooling, of a turbid, straw-yellow color. Color permanent after 24 hours, and liquid solidifies. Cottonseed oil causes liquid to become orange to brownish-red on solution of albumin, and no solidification takes place.

Brun (GLUCOSE MEDIUM). Dist. water, 140; glucose, 40; glycerin, 10; camphorated spirit, 10. Filter to remove excess of camphor.

Brunner (DIAZO REACTION). *a.*—Para-amido-acetophenone, 0.5 Gm.; hydrochloric acid, 50 Gm.; distilled water, 1,000 Gm. *b.*—Sodium nitrite, 0.5 Gm.; distilled water, 100 Gm. For use mix 100 Gm. *a* with 2 Gm. *b*. Place 10 Gm. of this mixture and an equal quantity urine in a test-tube, and add 2.5

Gm. of 10-per cent. ammonia water—in certain febrile diseases (*e. g.* typhoid) a ruby-red develops.

Brunner (GLUCOSIDES). On heating with bile and sulphuric acid they produce a red color (reversed Pettenkofer's reaction).

Brunner (NITROBENZENE). Red color is produced on adding potassa solution, alcohol and a little sulphur to nitrobenzene.

Brunner (PICRIC ACID). A woolen thread immersed in liquid containing picric acid, then rinsed lightly in water and extracted with ammonia, is colored red by potassium-cyanide solut.

Brunner (SULPHUR). Reddish color obtained on mixing sulphur with potassa solut. and adding few drops of nitrobenzene and alcohol to the mixture.

Bruno-Bizzari (GLUCOSE). Strips of white woolen material dipped in a 10-% aqueous stannous-chloride solut. and dried. Drop a few drops diabetic urine on prepared material and heat—decided dark spot appears. Test may be made quantitive by comparing spot with one caused by a glucose solut. of 1 or 2 : 200, or other known strength.

Brunotti (GELATIN IMBEDDING MASS). Dissolve 20 Gm. gelatin in 200 Cc. dist. water with heat, filter, and add 30 to 40 Cc. acetic acid and 1 Gm. mercuric chloride.

Buchheister (OLIVE OIL). Test depends on color reactions following addition to olive oil of equal parts nitric and sulphuric acids. See also *Boudet's* test.

Buchner (JALAP; SCAMMONY). Dissolve jalap and scammony resins in diluted potassa or soda solution, then heat and filter; no precipitate and only a slight opalescence should be caused by diluted sulphuric acid in excess.

Buckingham (ALKALOIDS). Freshly prepared solut. of 1 Gm. ammonium molybdate in 16 Gm. conc. pure sulphuric acid heated till solution is clear. Reagent yields precipitates of different colors with various alkaloids. "Comp. Hager, Pharm. Praxis," 1886, I. p. 204.

Budge (ASPHALT INJECTION MASS). Cover asphalt with benzene, and let stand several days; then preserve for use. Before injecting, add 30 to 50% benzene, and filter. Chloroform or turpentine may be used instead of benzene.

Bujwid (ARSENIC). A culture of the mold *Penicillium brevicaulis*, grown upon potato at 37° C., gives rise to a strong alliaceous odor in presence of such minute traces of arsenic as would scarcely respond to Marsh's test.

Bujwid (NITRITES). Dilute an alcoholic solution of indol (1 or 2 : 16,000) with water. On adding a few drops of this solut. to 10 Cc. water heated with a few drops hydrochloric acid (free from nitrites) to 70°-80° C., a fine red color develops if water tested contains nitrites.

Bujwid-Dunham (PRODUCTS OF ASIATIC CHOLERA BACILLUS). See *Pochl's* reaction.

Bunge (STAINING FLAGELLA). Mordant with mixture of 3 parts aqueous solut. tannin, and 1 part aqueous 1 : 20 ferric-chloride solution, adding to each 10 Cc. 1 Cc. of saturated aqueous solut. fuchsine. Treat with mordant for 5 minutes, then wash and stain with Neelson's solution.

Bunger (HARDENING FLUID FOR MICROSCOPIC SECTIONS). Chromic-acid solution (1-%), 25; osmic-acid solut. (1-%), 10; acetic acid (1-%), 20; water, 45.

Bunsen (PHOSPHORIC ACID). Phosphoric acid in minerals is indicated by formation of phosphoretted hydrogen on fusing the minerals with sodium and moistening with water.

Burchard (CHOLESTERIN AND CHOLESTERIN FATS). Dissolve substance in chloroform, then add acetic anhydride and a few drops sulphuric acid—a violet to green color develops.

Burgess (CITRAL AND OTHER AROMATIC COMPOUNDS). Dissolve 10 Gm. mercuric sulphate in 25-% H_2SO_4 to make 100 Cc. Vigorously shake 2 Cc. of substance with 5 Cc. of reagent, and note color after 10 minutes. *Citral* yields a bright-red color on shaking, which disappears rapidly with formation of a whitish compound. *Citronellal* gives a bright-yellow on shaking, and remains for some time. *Limonene* gives an evanescent faint flesh color. *Linalyl acetate* gives a brilliant permanent violet. *Linalol* gives a deep-violet quickly, and *Eugenol* affords a light-violet. *Caryophylline* gives a yellowish compound. For details see MERCK'S REPORT, X, p. 86.

Busch (DECALCIFICATION OF BONE). Dilute 1 vol. pure nitric acid (sp. gr. 1.25) with ten vol. water, for decalcifying large and tough bones; for young bones dilute to 1%. Treat bones

with 95-% alcohol for 3 days, then in the nitric acid for 8 to 10 days, the latter being changed daily. When decalcification complete, wash for 1 or 2 hours in running water, then immerse in 95-% alcohol, which should be changed after a few days. Young and fetal bones may be treated first with solut. containing 1% potassium bichromate and 0.1% chromic acid; then decalcified with 1- or 2-% nitric acid, to which 1% potassium bichromate or 0.1% chromic acid has been added. Then place in alcohol.

Busch (STAINING BONE). Stain sections of decalcified bone for 5 or 10 minutes in weak aqueous eosin solut., which may be preceded or followed by hematoxylin, then dehydrate in absolute alcohol, and mount without cleaning in benzene-balsam.

Busse (BOMBAY MACE). Immerse strips of white filter-paper in alcoholic extract of the mace for 30 minutes, then plunge in saturated baryta water quickly heated to boiling; remove and dry on filter-paper. With Bombay mace the dry strips assume a bright red; true Banda mace gives a brownish yellow, the under side of the paper being pale reddish brown. Papua mace gives colors resembling the Banda variety, but less intense.

Busse (CELLOIDIN SOLUTIONS). Three successive baths are prepared by dissolving 10 parts celloidin in 150, 105 and 80 parts respectively of a mixture of equal parts ether and absolute alcohol. See *Elsching's* solution.

Butschli (ACID HEMATOXYLIN). Dilute Delafield's solution and add enough acetic acid to decidedly redden it.

Butschli (IMBEDDING METHOD). Pass directly from chloroform into chloroformic paraffin solution, then evaporate chloroform at melting-point of paraffin.

Butschli (IRON HEMATOXYLIN). Treat sections with weak aqueous solut. ferric acetate, wash with water, and stain in 0.5-per cent. aqueous hematoxylin solution.

Cadet (ARSENIC). The characteristic odor of cacodyl develops on heating with sodium acetate.

Cadier (ALBUMIN). Same as *Tanret's* reagent (q. v.).

Cailletet (COPPER IN OILS). Shake 10 Cc. of oil with a solu-

tion of 0.1 Gm. pyrogallic acid in 5 Cc. ether—copper causes a brown color and turbidity.

Cailletet (FATTY OILS). 12 parts of phosphoric acid sp. gr. 1.44; 7 parts sulphuric acid sp. gr. 1.84; and 10 parts nitric acid sp. gr. 1.37. According to other authorities it is a nitric acid containing nitrous acid.

Cailletet (TARTARIC AND CITRIC ACIDS). Pour a saturated solution of potassium bichromate on a crystal of the acid. Pure citric acid slowly develops a brownish zone; if tartaric acid present the color is violet or black.

Caillian (GLUCOSE). On shaking urine with half its volume of chloroform, and allowing to stand, any glucose present will be found in the upper layer.

Calberla (GLYCERIN MIXTURE). Equal parts glycerin, alcohol, and water. Keep fixed objects in the mixture till required for dissection or section cutting.

Calberla (INDULIN STAIN). Dilute a conc. aqueous solut. of indulin with 6 vol. of water and stain sections 5 to 20 minutes. Then wash in water or alcohol and examine in glycerin or clove oil.

Calberla (MACERATING MIXTURE). Potassium chloride, 0.4 Gm.; sodium chloride, 0.03 Gm.; sodium phosphate, 0.2 Gm.; calcium chloride, 0.2 Gm.; water impregnated with carbon dioxide, 100 Gm. Mix 1 vol. of this solut. with half a vol. of Müller's solut., and 1 vol. water. The Muller's solut. may be replaced by a 2.5-per cent. solut. ammonium chromate. Nerve and muscle tissues of embryos are macerated in this mixture, then isolated by teasing and shaking; specimens are finally mounted in conc. solut. potassium acetate.

Calberla (METHYL-GREEN AND EOSINE). Dissolve eosine 1, and methyl green 60, in warm 30-per cent. alcohol. Stain sections in this for 5 to 10 minutes, wash quickly in successive alcohols, and mount in balsam or glycerin.

Calvert (FIXED OILS). Characteristic color reactions are produced on shaking fixed oils with one-fifth their bulk of nitric or sulphuric acid of varying strengths, and putting aside for five or ten minutes. A mixture of the strong acids (equal parts) may also be used, and when nitric acid is used alone, an excess of soda solution may or may not be used subsequently.

Other variations of the test involve the use of syrupy phosphoric acid, nitro-hydrochloric acid, followed by excess of soda solution; a mixture of equal volumes of water, nitric acid and sulphuric acid; or 1 volume of soda solution may be added to 4 volumes of oil, prior to boiling.

Camoin (SESAME OIL). Same as *Baudoin's* test.

Campani (COPPER). Copper gives a yellow to orange-red precipitate on mixing a solution of glucose with lead-subacetate solution.

Campani (GLUCOSE). Mixture of a concentrated lead-acetate solution with a dilute copper-acetate solution. Cane-sugar causes no change; glucose reduces the copper salt.

Campani (MANGANESE). Exhaust ashes containing manganese with hot water and boil with mixture of nitric acid, 85 volumes, phosphoric acid, 15 volumes. Evaporate clear liquid to dryness, take up residue with hydrochloric acid, and again evaporate to dryness—amethyst color develops.

Campani (POTASSIUM SALTS). Bismuth-sodium-thiosulphate (obtained by dissolving bismuth subnitrate, 1, in smallest possible quantity of hydrochloric acid, and adding sodium thiosulphate, 1). In aqueous solution potassium salts give with reagent a yellow precipitate insoluble in alcohol.

Candussio (PHENOLS). Solut. of potassium ferricyanide, 1 part in 100 parts 10- or 20-% ammonia, gives various color reactions with different phenols.

Capezzuoli (SUGAR). Precipitate ferric hydroxide by excess of potassa. If sugar present, a dark, orange-yellow ring is developed in 24 hours at surface of precipitate.

Cappagnoli (GLUCOSE). According to Wilder, a blue color is produced on adding solut. copper hydroxide in potassa solution.

Capranika (BILIARY PIGMENTS). Add solut. bromine in chloroform to urine—if biliary pigments present a green color develops, which, on shaking with hydrochloric acid, is taken up by the acid.

Capranika (GUANINE). With solutions containing guanine, picric acid gives yellow, concentrated potassium chromate an orange red, and potassium ferricyanide a brown precipitate.

Add a few drops of fairly fresh oil turpentine to a few Cc. milk in porcelain saucer and heat slowly, then add alcoholic solut. resin guaiac—unboiled milk is colored blue; boiled milk gives no color.

Carey Lea (GELATIN). Acid solution of mercuric nitrate gives a red color.

Carey Lea (HYDROCYANIC ACID AND CYANIDES). Ferrous-ammonio-sulphate, 1; uranium nitrate, 1; water, 240 or 250. Reagent gives a purple-red color or precipitate with hydrocyanic acid or its salts. Add 2 drops of the suspected liquid, on a porcelain slab, to 2 drops of the test solution, so that the two liquids just touch.

Carey Lea (THIOSULPHATES). A rose-red to scarlet color is produced on boiling with a few drops solution of ruthenium chloride in presence of ammonia.

Carey Lea (IODINE). A bluish color is developed on adding starch paste, stirring well, then adding a drop dilute solut. of potassium bichromate and a few drops of hydrochloric acid.

Carizzi (BLEACHING PROCESS). Cover small quantity of sodium dioxide with 10-% solut. tartaric or acetic acid, and cautiously overlay with 70-% alcohol. Saturate objects with alcohol, and suspend in supernatant alcoholic fluid. Avoid using mineral acids or much dioxide, or reaction may be very violent.

Carlinfanti (MODIFIED BAUDOUIN'S TEST). After shaking oil with hydrochloric acid containing sugar, allow mixture to deposit—if sesame oil present, the hydrochloric acid appears purplish-red; color is permanent on dilution with three parts water, whereas a similar coloration, when pure olive oil is present, disappears.

Carnot (ARSENIC). Precipitate as sulphide, and convert latter into arsenic acid—by ammonia, silver nitrate and hydrogen peroxide—and determine this as bismuth arsenate (very insoluble in dil. nitric acid), which is simply dried and weighed.

Carnoy (ACETIC ALCOHOL). 1.—Glacial acetic acid, 1 part; absolute alcohol, 3 parts. 2.—Glacial acetic acid, 1 part; absolute alcohol, 6 parts; chloroform, 3 parts. The addition of chloroform is said to render the action of the mixture more rapid.

Carnoy (HARDENING SOLUTION). Chromic-acid solution (2-%), 45; osmic-acid solution (2-%), 16; glacial acetic acid, 3.

Carnoy (SALT SOLUTION). Add a trace of osmic acid to a 0.75-% aqueous solut. sodium chloride.

Carnoy (TANNIN SOLUTION). Tannin, 0.5 Gm.; water, 100 Gm.

Carnoy (TOLU CEMENT). Tolu balsam, 2 parts; Canada balsam, 1 part; saturated solution shellac in chloroform, 2 parts; and enough chloroform to make cement of syrupy consistence.

Caro (REAGENT). Solut. potass. persulphate in conc. H_2SO_4. Used as an oxidizer.

Caro-Fischer (SULPHURETTED HYDROGEN). The reagent is para-amido-dimethylaniline sulphate. Add to fluid to be tested 1-50th of its weight strong hydrochloric acid and a few particles of the sulphate, followed by a few drops dilute ferric-chloride solution—if sulphuretted hydrogen present, methylene blue is formed, which is at once evident from its characteristic color.

Carpené (TANNIN IN WINE). Tannin is precipitated by a saturated solution zinc acetate in 5-% ammonia.

Carter (FIXING SOLUTION). Formaldehyde, 10; dist. water, 10; acetic acid, 1. Solut. kills and fixes tissues very quickly, and does not shrink cells. Leave tissues in solut. 6 to 12 hours, remove to 50-% alcohol for 1 hour, then leave 15 to 30 minutes in 75-% alcohol, then for equal period in 90-% alcohol, then mount as usual. Any staining solut. may be used with this fixing solut.

Carter (INDICAN IN URINE). Overlay urine on nitric acid—play of colors ensues, and a deep-blue to purple ppt. forms on adding sulphuric acid. Bile also gives play of colors.

Casali (BILIARY PIGMENTS). 1.—On adding barium dioxide, lead dioxide, stannic chloride, or antimonous chloride, with either sulphuric or hydrochloric acid, to a biliary pigment, a play of colors through yellow, red, wine-red, violet, and bluish-violet takes place. 2.—Various colors are produced on precipitating urine containing biliary matter with solution lead acetate and ammonia, extracting with ether and hydrochloric acid, evaporating ethereal layer, and adding oxidizing agents.

Casamajor (GLUCOSE). Methyl alcohol causes a cloudy appearance.

Casoria (WATER IN ALCOHOL). Absolute alcohol does not affect color of dehydrated copper sulphate, but if water present the salt turns blue.

Castle (BROMINE AND IODINE). Dichlorbenzene-sulphamide, in solid substance or solution in chloroform, is added to the solution to be tested. From metallic iodides and bromides the halogens are liberated as by free chlorine, and can be recognized by the color imparted to carbon disulphide or chloroform.

Causse (POLLUTED WATER). Pure water restores the color to hexamethylene rosaniline decolorized by H_2SO_4, while polluted waters give no color with the reagent. Reagent is an aqueous 1:1,000 solut. of "violet crystals" decolorized by H_2SO_4.

Cavalli (ALKALINITY OF WATER). Add 2 or 3 drops of a 1-% solut. toluylene-red to 50 Cc. water—intense yellow if water alkaline; if alkalinity very slight, color is orange or pale-red. Sensitive 1:1,000,000 to alkali carbonate.

Cazeneuve (COAL-TAR DYES IN WINES). The filtrate from natural wines when shaken with yellow mercuric oxide is colorless;—if aniline dyes are present it is distinctly colored.

Cazeneuve (METALS). Diphenyl carbazide in benzin solut. gives various color reactions with different metallic salts, in very dil. aqueous solut., *e. g.* copper gives a fine violet, passing into the benzin; mercurous salts give a dark-blue and ferrous salts a pink, becoming brown with potass. ferrocyanide, even in dil. of 1:100,000. Color is destroyed by excess of acids. Gold and silver salts give rose tints with pptn. of metal; chromic acid (1:1,000,000 part of metal) gives a decided violet color stable with excess of acids, and not taken up by benzin, but taken up by amylic alcohol.

Cazeneuve-Cotton (METHYL ALCOHOL). Distil several fractions of suspected spirit and add to each 1 Cc. of potassium-permanganate solution (0.5-%). If free from methyl alcohol, only the first two fractions immediately reduce the color.

Cazeneuve-Defournel (NITRATES IN WATER). Glacial formic acid is used instead of sulphuric acid in applying the brucine test for nitrates.

Chamberlain-Austen.—See *Austen-Chamberlain.*

Chancel (FUCHSINE). Wine colored with fuchsine retains its color after heating 10 Cc. with 3 Cc. of lead-subacetate solution (1:20) and filtering. Acidify red filtrate with acetic acid, take up the color with fusel oil and identify.

Chapman (PHENOLS). Dissolve 1 Cc. of the phenol in 5 Cc. acetic anhydride, and add a small fragment $ZnCl_2$, or conc. H_2SO_4. Some of the color-reactions are as follows: *Eugenol*—with H_2SO_4, brown, changing to purple and finally wine red; with $ZnCl_2$, pale-yellow, disappearing on standing. *Iso-eugenol*—with H_2SO_4, rose-red becoming light-brown; with $ZnCl_2$, rose-red. *Saffrol*—with H_2SO_4 emerald-green, changing to brownish-green and finally brownish; with $ZnCl_2$, pale-blue, finally light-brown. *Iso-saffrol*—with H_2SO_4 pale-pink, becoming reddish; with $ZnCl_2$, pink, becoming brownish-red and finally brown. *Estragol*—with H_2SO_4, purple, then indigo-blue, and finally bluish-purple; with $ZnCl_2$, bluish-violet to indigo-blue, and finally brownish. *Anethol*—with H_2SO_4, at first no color, then pale-yellow after a time; with $ZnCl_2$, pale-yellow becoming darker, and finally brick-red.

Chapman-Smith (TARTARIC AND CITRIC ACIDS). Boil with a strongly alkaline solution potassium permanganate—tartaric acid reduces it at once; with citric acid the green color remains.

Chatard (NITROUS ACID). A distinct odor of carbolic acid is apparent on evaporating a solution of nitrous acid nearly to dryness and rubbing with a few drops aniline-sulphate solution.

Chatin-Gaultier de Claubry (IODINE). A blue to violet color is produced on adding starch together with a mixture of nitric acid, 1 volume, and sulphuric acid, 6 volumes.

Chautard (ACETONE IN URINE). 1.—Dissolve 1 part fuchsine in 150 parts warm water, and pass in current of sulphurous-acid gas till decolorized. This solution added to an equal volume of urine is reddened in 1 to 2 minutes if acetone is present. 2.—Distil 200 Cc. of urine and test first 15 Cc. with decolorized magenta solution, made by mixing 30 Cc. magenta solution (1 in 1,000), 20 Cc. saturated sodium-bisulphite solution, 3 Cc. strong sulphuric acid, and 200 Cc. water. See also *Gayon's* test.

Chenzinsky (METHYLENE BLUE AND EOSINE). Saturated aqueous solution methylene blue, 40 parts; 0.5-% solution eosine in 70-% alcohol, 20 parts; distilled water or glycerin, 40 parts.

Chevreuil (TEST-PAPER). Hematoxylin Paper. Paper gives with alkalies a blue color, and with acids a red.

Chevreul (AMMONIA). Red color of hematoxylin paper is changed to violet or blue by ammonia.

Chiappe (MINERAL ACIDS IN VINEGAR). Color of methyl violet is changed to ultramarine-blue on adding to vinegar containing mineral acids.

Chlopin (OZONE). Dissolve Urso D. or T., in absolute alcohol, and impregnate strips of ordinary filtering paper with the brown solution, which must be freshly prepared each time before use. On moistening the test-paper with water and exposing it in an atmosphere containing ozone, it immediately acquires a blue color, which, according to the quantity of ozone present in the air, may change to a violet or dark-blue. The new test-paper is not affected by H_2O_2. H_2SO_3, Cl and Br, color the Ursol paper at first bluish-green, but the color, however, soon changes to yellow. CO_2 is said to be entirely without action on the new test-paper.

Christen (ALBUMIN). Tannin produces a turbidity or precipitate with solution of albumin.

Ciamician-Magnanini (SKATOL). Heat skatol with sulphuric acid—a bright purple red color develops.

Clark (CREOSOTE; PHENOL). Boil with excess of nitric acid till red fumes no longer evolved—carbolic acid forms yellow crystals; creosote does not.

Clark (SOAP SOLUTION). Dissolve 10 Gm. Castile Soap in 35-% alcohol, and standardize against a solut. made by dissolving 1 Gm. $CaCO_3$ in smallest excess of HCl, neutralizing with NH_3 and adding H_2O to 1,000 Cc.

Clarus (SOLANINE). Chromic acid solution gives a sky-blue color with solanine.

Claus (UREA). Nitrous acid decomposes urea in solut. into carbon dioxide and nitrogen. Course of reaction depends on quantity of nitrous acid and other circumstances.

Claus (WATER). Moisten anthraquinone and sodium amalgam

with alcohol—if latter contains water a red color develops. Absolute alcohol gives a green color.

Clowes (INFLAMMABLE GAS). Test serves for detecting and estimating inflammable gases in air, present in least explosive proportion. Burn a hydrogen flame 10 Mm. in height in air to be examined—the appearance of the pale flame or "cap" surmounting and surrounding the hydrogen flame, and observed against a black background in a darkened space, serves as an indication of gas or vapor, and the height of the cap may be directly translated into percentages of gas present by tables published by author in his "Detection and Measurement of Inflammable Gas and Vapor in Air."

Codina-Laenglin (OLIVE OIL). Heat 1 Gm. dilute nitric acid (nitric acid, sp. gr. 1.33, 3 parts; water, 1 part) with 3 Gm. olive oil on water-bath—characteristic color-reactions take place.

Cohen (ALBUMIN). Solution bismuth-potassium iodide precipitates albumin and alkaloids from acid solutions. See *Dragendorff's* test.

Cohn (CULTURE SOLUTIONS). 1.—Water, 200 Cc.; ammonium tartrate, 2 Gm.; potassium phosphate, 2 Gm.; magnesium sulphate, 0.1 Gm.; tricalcic phosphate, 0.1 Gm. 2.—(COHN'S NORMAL SOLUTION.) Water, 200 Cc.; acid potassium phosphate, 1 Gm.; magnesium sulphate, 1 Gm.; ammonium tartrate, 2 Gm.; calcium chloride, 0.1 Gm.

Cohnheim (GOLD METHOD). Place pieces of tissues in 0.5-% gold-chloride solut. until quite yellow, then expose to light in water acidulated with acetic acid until gold thoroughly reduced. Mount specimens in acidulated glycerin.

Colasanti (SULPHOCYANIC ACID). Warm a dilute solut. of substance with solut. of gold chloride (1:1,000-10,000) in potassium hydrate or sat. solut. sodium bicarbonate—violet color develops, and gold deposits on cooling.

Cole (CARMINE METHOD). Wash sections in water to remove alcohol, then stain with Grenacher's borax-carmine 3 to 5 minutes, and wash in methylated spirit. Afterwards immerse in mixture methylated spirit, 5 parts, and hydrochloric acid, 1 part, for 5 to 10 minutes. Again wash well in spirit to remove all traces of acid, then dehydrate in stronger spirit for

10 to 15 minutes, clear in clove oil for 5 minutes, wash in turpentine, and mount in benzene-balsam.

Cole (FREEZING PROCESS). Dissolve picked acacia, 4 oz., in distilled water, 6 fl. oz., and to each 5 parts of resulting mucilage add 3 parts syrup (sugar, 1 pound, in distilled water, 1 pint). To each ounce of medium add 5 grains pure carbolic acid, and soak tissues in it prior to freezing. For tissues liable to come in pieces mix 4 parts syrup with 5 of mucilage.

Cole (HEMATOXYLIN METHOD). *a.*—Hematoxylin, 30 grains; absolute alcohol, 3½ fl. oz.; *b.*—ammonia alum, 30 grains; water, 3½ fl. oz. Mix *a* and *b*, then add glycerin, 3½ fl. oz., and glacial acetic acid, 3 fl. dr. Leave mixture exposed to light for at least a month, then filter and keep in a stoppered bottle. Wash sections in distilled water to remove alcohol, or if the material has been hardened with chromic acid, treat with 1-% aqueous solution of sodium bicarbonate and then wash well in water. Next add 10 to 20 drops of the hematoxylin solution to a watch-glassful distilled water and immerse sections for 10 to 30 minutes. Again wash in distilled water, then in ordinary tap water, dehydrate with methylated spirit, clear in clove oil, and mount in benzene-balsam. If sections over-stained, remove excess of color before dehydration by soaking for a few minutes in a 0.5-% solution glacial acetic acid in distilled water, then wash again in tap water and proceed as above.

Cole (HEMATOXYLIN AND EOSINE METHOD). Stain sections with hematoxylin as above, but before clearing immerse in alcoholic solution eosine (1 grain to 1 fl. oz.) for five minutes, wash well in methylated spirit, clear in clove oil, and mount in benzene-balsam.

Cole (PICROCARMINE METHOD). Dissolve 1 Gm. carmine in 10 Cc. distilled water and 3 Cc. of strong ammonia, then add solution to 200 Cc. of a saturated aqueous solution picric acid. Leave mixture exposed to the air until it has evaporated to one-third its bulk, then filter and keep in a stoppered bottle. Stain sections for 0.5 to 1 hour, place on slides without washing, and after draining off excess of stain, mount in Farrant's medium.

Cole (SLOW OR EXPOSURE METHOD OF MOUNTING). Dissolve

dried Canada balsam, 3 oz., in benzene, 3 fl. oz., and filter. Apply a clean cover-glass to a slide that has been moistened by breathing on it, and place a few drops of balsam solution on cover-glass. Then remove a section from turpentine, and put it into the balsam. Put aside for 12 hours to allow benzene to evaporate, and having warmed a slide and added a drop fresh balsam solution to that on cover-glass, bring the fluid balsam in contact with the warmed side. Press cover down carefully to avoid inclusion of air bubbles, and when excess of balsam is squeezed out, put slide aside to cool, after which it may be cleaned with a camel's-hair brush or soft rag moistened with methylated spirit.

Conrady (CANE SUGAR IN MILK SUGAR). Dissolve 1 Gm. of milk sugar in 10 Cc. water; then add 0.1 Gm. resorcin and 1 Cc. hydrochloric acid, and boil mixture for five minutes—if cane sugar present a reddish color develops.

Conroy (COTTONSEED OIL IN LARD). Silver nitrate, 5; nitric acid (sp. gr. 1.42), 1; alcohol, 100. Melt 10 Gm. lard in test-tube, add 2 Gm. test-solution, and immerse tube in boiling water for 5 minutes—pure lard remains white, but cottonseed oil present (even 1%) causes brownish color.

Conroy (OLIVE OIL). Heat 9 volumes of oil with 1 volume nitric acid (sp. gr. 1.42), and note color and consistence of the mixture.

Contejean (FREE HYDROCHLORIC ACID IN GASTRIC JUICE). Heat a drop of gastric juice with freshly precipitated cobaltous hydroxide in a watch-glass—if hydrochloric acid present, cobaltous chloride forms, and colors solution blue on evaporation.

Corne (IODATES). Starch and water, in which phosphorus has been kept, give with iodides containing iodates, a blue color.

Cotton (BRUCINE). A violet to green color develops on adding excess of sodium-sulphydrate solution to a warm solution of brucine in nitric acid.

Cotton (PHENOL). See *Lex's* test.

Cotton-Cazeneuve.—See *Cazeneuve-Cotton.*

Couerbe (NARCOTINE). A blood-red color develops on heating with sulphuric acid.

Cox (MERCURIC IMPREGNATION MIXTURE). Five-per cent. potassium-bichromate solution, 20 parts; 5-% mercuric-

chloride solution, 20 parts; 5-% potassium-chromate solution, 16 parts; water, 30 to 40 parts.

Crace-Calvert (FATTY OILS). Treat oils with sulphuric and nitric acids of given concentration, with phosphoric acid, or with nitro-hydrochloric acid, and note color reactions, as well as changes in color and consistency caused by boiling oils with soda lye, either with or without addition of hydrochloric acid. For detailed information, see Benedikt, "*Analyse der Fette*," edit. II, p. 307.

Crampton-Simons (CARAMEL IN LIQUOR AND VINEGAR). Add 25 Gm. Fuller's earth to 50 Cc. of liquid in beaker, let stand 30 minutes, and filter. Percentage of color absorption is determined by Lovibond tintometer before and after treatment; or compare with sample of liquid colored.

Cresti (COPPER). Place a zinc-platinum element, formed of two wires, in liquid suspected to contain copper; on removing the platinum wire, rinse with water and expose for a moment to action of hydrobromic acid and bromine vapors, produced by heating potassium bromide with sulphuric acid—the deposit of copper becomes violet.

Creuse (SALICIN IN QUININE). Potassium bichromate and dilute sulphuric acid give no change with quinine. If salicin present, odor of salicylic aldehyde develops.

Cripps-Dymond (ALOES). 1.—Triturate 0.05 Gm. aloes, or residue left upon evaporation, with 16 drops conc. sulphuric acid and 4 drops nitric acid (sp. gr. 1.4), and add 30 Gm. water —an orange to carmine color develops, which is darkened to deep wine-red by ammonia. (Rhubarb, senna and frangula interfere with the reaction.) 2.—All aloins are precipitated by ferric chloride or lead acetate. Barbaloin and nataloin are colored carmine-red by cold nitric acid; socaloin and curaçaloin are colored red by fuming nitric acid. Barbaloin, dissolved in a drop of concentrated sulphuric acid, is colored red upon the addition of nitric acid. Nataloin is colored blue by similar treatment.

Crismer (ALDEHYDES). Nessler's reagent, or a solut. potassio-mercuric iodide with baryta water, affords yellow to brown-black precipitates insol. in potassium cyanide.

Crismer (INDICATOR). The indicator for alkalimetry, known

as "resazurin," is obtained by adding 45 drops nitric acid, sp. gr. 1.25, saturated with nitrous acid, to a solution of resorcin, 4 Gm., in anhydrous ether, 200 Cc. After standing for two days the crystals which have formed are separated and washed with ether until washings colored blue with ammonia. It gives a red color with acids and blue with alkalies and alkali carbonates.

Crismer (SAFRANINE TEST FOR GLUCOSE). Heat to 60°-65° C., 5 Cc. of a 1:1,000 aqueous solution safranine with 1 Cc. urine and 2 Cc. of a 10-% soda solution; liquid is decolorized if glucose present. Allen takes equal measures (2 Cc.) of safranine solution, urine, and normal soda or potash solution, and heats mixture till it boils freely. If urine contains more than 0.1% sugar, liquid will be decolorized, but otherwise the red color remains intact or is only partially discharged. Uric acid and creatinine do not affect safranine.

Crismer (TARTARIC ACID). Trace of tartaric acid added to a weak solution ammonium molybdate, followed by one or two drops hydrogen dioxide, or a trace of sodium peroxide, and the mixture warmed to 60° C., gives at first a green color which changes to blue.

Crismer (TURPENTINE IN VOLATILE OILS). Dissolve 20 Gm. potassium bitartrate in 1 liter water, and neutralize with manganous carbonate (about 6 Gm.), mix 3 Cc. of this solution, 5 Cc. of suspected oil, and 5 drops ammonia water, shake well, heat on water-bath, and pass current of air through mixture for 30 seconds. Oils of lemon and bergamot become dark brown; oil turpentine turns intense brownish black; most volatile oils, if pure, acquire only faint yellowish tinge.

Crolas-Ducker (URANIUM SALTS). Macerate a mixture of cochineal, 10, and alum, 10, with 60-% alcohol, for 48 hours, then filter. Solution gives a green color with uranium salts. Malot suggests that it may be used as an indicator for the titration of phosphoric acid.

Crook (BUTTER). Pure butter yields a clear liquid on melting 10 grains in a test-tube, adding 30 minims carbolic acid (Calvert's No. 2, diluted with one-eighth its weight water), shaking, warming till clear, and allowing to stand. Most other fats form two layers.

Crookshank (STAINING FLAGELLA). Stain cover-glass preparations with a drop of concentrated alcoholic solution of gentian violet, then rinse in water, allow to dry, and mount in balsam.

Cross-Bevans (CELLULOSE SOLVENT). Solution zinc chloride, 1 part, in concentrated hydrochloric acid, 2 parts.

Crouzel (SANTONIN IN URINE). On adding conc. $Ca(OH)_2$ to urine containing santonin eliminated by the kidneys, a characteristic carmine-red color develops. The color is best developed by nascent $Ca(OH)_2$, *e. g.*, on adding some calcium carbide to the urine. The sensitiveness is such that 0.1 Gm. santonin taken internally will suffice to afford a color reaction with all the urine voided during the next 60 hours. The color lasts for about 30 minutes.

Crouzel-Dupin (ANIMAL AND VEGETABLE FATS IN PETROLEUM). Add 5 drops satur. solut. potassium permanganate to 5 Gm. of petrolatum and triturate; if petrolatum pure, rose-red color persists; if not, permanganate is reduced and color becomes brown, depth depending on extent of admixture.

Csokor's [*Czoker's*] (ALUM COCHINEAL). Dissolve 1 Gm. of ammonia alum in 100 Cc. distilled water, add 1 Gm. powdered cochineal and boil. After evaporating to half the original bulk, filter and add 0.5 Cc. of carbolic acid.

Csokor's [*Czoker's*] (TURPENTINE CEMENT FOR CLOSING GLYCERIN MOUNTS). Break common resinous turpentine of commerce into small pieces, melt on a water-bath, and allow to cool. A brittle, dark-brown mass results. See also *Parker's* turpentine cement.

Cuccati (CARMINE SOLUTION). Dissolve 20 Gm. Na_2CO_3 cryst. in 100 Cc. warm water, add 50 Gm. carmine, boil, remove from heat, and add 30 Gm. absolute alcohol. After several days filter, and slowly add 300 Gm. water, 8 Gm. 20-% solut. acetic acid, and 2 Gm. chloral hydrate. Requires 15 minutes for staining.

Cunisset (BILIARY MATTER). A yellow color is imparted to chloroform shaken with urine containing biliary pigments.

Curtman (POTASSIUM SALTS). A yellow precipitate forms on adding to a solution of a potassium salt a solution of 1 part

cobalt nitrate in 10 parts saturated sodium-nitrate solution acidified with acetic acid.

Czaplewski (CARBOL-GLYCERIN-FUCHSINE). 1 Gm. fuchsine, 5 Cc. liquefied carbolic acid, 50 Cc. glycerin, and 100 Cc. dist. water. Dilute 4 to 10 times for use as a stain.

Czoker.—See *Csokor*.

Czumpelitz (ALKALOIDS). Characteristic color reactions develop on treating alkaloids with a solution of zinc chloride, 1 Gm., in 60 Cc. of a mixture containing equal parts of hydrochloric acid and water.

Dahlmann (PAPER). A very dilute solution of gold and sodium chloride produces a reddish-brown color with bleached and unbleached sulphite cellulose, sulphate cellulose, and soda cellulose, and a yellow color with wood-fibre; bleached straw paper shows no change of color.

Danielewsky (AROMATIC SUBSTANCES IN BLOOD, ETC.). An azo-reagent (diazo-sulphanilic acid?) is added, the solution slightly acidified with hydrochloric acid, and then made alkaline—presence of aromatic compounds is indicated by an orange-red color.

Danziger (COBALT). The following test, properly carried out, will detect cobalt in a 1:500,000 aqueous solution, provided the solution is colorless, or but slightly colored: To about 5 Cc. of the solution, acidulated with HCl, add solid ammonium thioacetate together with a few drops of stannous-chloride solution, and an equal volume of amyl alcohol, or a mixture of acetone and ether, or alcohol and ether: shake the whole well and allow to separate. If any cobalt is present, the upper layer will be colored blue, the intensity of the color varying with the amount of cobalt present. The $SnCl_2$ is added to reduce any iron present, as ferric iron gives a deep red color, as with ammonium thiocyanate. Amyl alcohol diminishes the dissociation, and extracts the color produced by the undissociated cobalt salt. This consists of a double cobalt-ammonium thioacetate, containing two molecules of ammonium thioacetate to one molecule of cobalt thioacetate.

Darton (GOLD). Reduce ore supposed to contain gold to fine powder and shake well in a test-tube with aqueous solution of iodine (iodine, 1; potassium iodide, 1.5; water, 36). Dip

a strip of filtering paper into the solution, dry and heat on platinum foil to redness. After cooling, ashes will be purple if gold present.

Da Silva (ESERINE). Dissolve fragment of alkaloid or a salt in 1 or 2 drops fuming nitric acid, and heat on water-bath in capsule—orange color develops. On evaporating to dryness while stirring residue becomes green. A drop of nitric acid added to residue turns it blue in spots, and forms finally a reddish-violet solution which changes to a fluorescent greenish-yellow on dilution, and blood-red by transmitted light.

David (ALCOHOL-ACETIC ACID FOR EXAMINATION OF FATTY ACIDS). 300 Cc. of 95-per cent. alcohol and 220 Cc. of a mixture of equal volumes of glacial acetic acid and water. This solution dissolves only the liquid fatty acids from a mixture of fatty acids, and leaves the solid fatty acids undissolved.

Davy (ALCOHOL). Dissolve molybdic acid, 1, in strong sulphuric acid, 10. The solution gives a blue color on warming with any fluid containing alcohol. Detects 1 of alcohol in 1,000 of water. Essential oils should be shaken with water and separated before applying this test; urine must be distilled.

Davy (ARSENIC). The diluted sulphuric acid in Marsh's test is replaced by an amalgam of mercury and sodium.

Davy (MANGANESE). 1.—A green color is produced on heating manganese to redness on silver foil with a few drops of potassa solution. 2.—A white precipitate is formed on heating manganese to redness on platinum foil with sulphur, dissolving the residue in water and adding iron ferrocyanide.

Davy (PHENOL). Dissolve molybdic acid, 1, in strong sulphuric acid, 10, and add 3 or 4 drops to 1 or 2 drops of the suspected liquid. If phenol present a dark olive-green to blue and violet color develops.

Davy (STRYCHNINE). A deep violet color is produced on treating strychnine with sulphuric acid and adding powdered potassium ferricyanide.

Davy-Leconte (UREA). On treating urea with a hypochlorite in alkaline solut., urea is decomposed into CO_2 and N. The former is absorbed by the alkali, and the volume of the latter then estimated.

Day (PUS). The formation of a blue color upon the addition of 1 or 2 drops of an oxidized tincture of guaiac (old, or shaken with air) to urine indicates the presence of pus.

Deacon (AMYGDALIN). On treating amygdalin with a few drops conc. H_2SO_4 a bright carmine color develops, discharged on pouring into water.

Deane (GLYCERIN JELLY). Soak gelatin, 30 Gm., in water, then melt and add glycerin, 120 Gm.

Deane (MEDIUM). Soak gelatin, 1 oz., in water, 4 fl. oz., until soft, then add honey, 5 fl. oz., heated to boiling-point. Boil mixture, then allow to cool somewhat, but before it is set add alcohol, 4 fl. dr., and creosote, 5 or 6 drops. Finally, filter through fine flannel.

Debrunner (NITROBENZENE). Nitrobenzene in alcoholic beverages can be detected by taking up with ether, separating, and adding a few drops dilute acetic acid, a little very fine iron filings, and sufficient water. When the oil drops have disappeared, decant, treat with soda, take up with ether, evaporate, and add a few drops of hydrochloric acid, with a little potassium chlorate. A blue to green color indicates the presence of nitrobenzene.

Debrunner (WATER IN ALCOHOL). A purple color on adding potassium permanganate to alcohol indicates the presence of water (the salt is insoluble in absolute alcohol).

Dechan (INDICATOR). Gallein (alizarin violet). Gives a bright-red color with alkalies, and a pale-brown with acids.

Deen, Van- (BLOOD). A blue color develops on adding a few drops of freshly prepared tincture guaiac and ozonized turpentine oil to a very dilute (almost colorless) liquid containing blood.

Defacqz (PHENOLS AND ALKALOIDS). Heat 1 part tungstic acid with 4 or 5 drops potassium bisulphate and few drops sulphuric acid, then add sufficient sulphuric acid to prevent solidification on cooling. Add 1 drop of reagent to 1 drop of solution (or few solid particles) to be tested, and triturate a few minutes with glass rod. *Phenol*—very intense red; *para-cresol*—intense red-brown; *thymol*—vermillion; *hydroquinone*—very intense amethyst-violet; *resorcin*—red-brown; *pyrocatechin*—black-violet. Sometimes black; *pyrogallol*—

red-black; *alpha-naphtol*—violet-blue; *beta-naphtol*—violet blue; *salicylic acid*—very intense Saturn red; *meta-oxybenzoic acid*—feeble Saturn red; *para-oxybenzoic acid*—nothing *quinine* and *cinchonine*—faint yellow; *morphine*—amethyst violet, then brown; *codeine*—rose, turning violet; *conicine*—intense rose; *solanine*—gamboge; *veratrine*—intense sienna then red-brown; *aconitine*—yellowish-brown; *narceine*—yellowish-green, then moss-green; and *picrotoxin*—very intense orange-red. In general these colors are destroyed by water. Strychnine, brucine, nicotine, atropine, cantharidin, caffeine santonin, pilocarpine, ergotinine, and hyoscyamine give no color.

Degener (INDICATOR). Phenacetolin, a brown substance obtained by heating together for several hours one equivalent each of phenol, sulphuric acid, and glacial acetic acid, is turned red by caustic alkalies; but yellow with acids.

Deiss (COTTONSEED OIL). See *Labiche's* test.

Delafield (HEMATOXYLIN). Hematoxylin, 4 Gm., and absolute alcohol, 25 Cc.; add the solution to 400 Cc. of a saturated aqueous solution of ammonia alum. Expose mixture to light and air for 3 to 4 days, then filter and add glycerin, 100 Cc., and methylic alcohol, 100 Cc. Again expose the solution to light until it becomes dark-colored, then filter and preserve in a stoppered bottle. See also *Grenacher's* test.

Delffs (ALKALOIDS). Potassium platino-cyanide forms salts with alkaloids. See *Mayer's* test.

Delffs (CAFFEINE). A crystalline precipitate falls on adding solut. mercuric oxide in potassium iodide to a solut. of caffeine. Other alkaloids yield amorphous precipitates.

Deniges (CHLORATES). Resorcin, 1 Gm.; water, 100 Cc.; sulphuric acid, 10 drops. Mix 2 drops of suspected liquid with 2 Cc. sulphuric acid, cool, and add 5 drops of reagent—green color develops if not more than 2% chlorate present (Nitrates give yellowish color turning to purplish-red; nitrites a blue; hence insure their absence).

Deniges (CITRIC ACID). To 5 Cc. of citrate solution add 1 Cc. of mercuric-sulphate solution (mercuric oxide, 5 Gm.; conc. sulphuric acid 20 Cc.; water 100 Cc.). Boil, and add while warm 5 or 6 drops permanganate solut.—decolorization

rapidly ensues, and characteristic white ppt. forms. Test not affected by other organic acids.

Deniges (GLYCERIN). 1.—Nessler's test. 2.—Hot mixture of equal vol. 2-% silver-nitrate solut., ammonia, and soda lye. Exhaust substance, mix extract with 4 parts potassium bisulphate, and heat. A rod moistened with Nessler's solut. or the silver solution will show slightest trace of acrolein, the tip becoming brown to black.

Deniges (HYDROCYANIC ACID). Ammonia water, 2 Cc.; 10-% potassium-iodide solution, 1 drop; water, 20 Cc.; silver-nitrate solut. (2-%), 1 drop. Place a few Cc. of liquid to be examined in test-tube with zinc and 15 to 20 drops sulphuric acid, and hold glass rod moistened with potassa solution in space over liquid. Now dip rod in reagent—if any hydrocyanic acid present (as potassium salt on rod) the opalescent reagent becomes clear.

Deniges (HYDROGEN DIOXIDE). Mixture of 1 Cc. of a 10-% aqueous ammonium-molybdate solut. and 1 Cc. conc. sulphuric acid. Hydrogen dioxide gives an intensely yellow color with this reagent.

Deniges (IODOFORM). Evaporate ethereal extract containing iodoform to dryness and add 3 or 4 drops of a liquid containing iodoform with 4 or 5 drops dimethylamine—a yellow color develops proportionate to iodoform present. Heat mixture carefully to boiling, cool, and add alcohol—the liquid is red by transmitted light and violet by reflected light if much iodoform present; if only little iodoform, liquid is violet.

Deniges (METALS). Alloxan solut. (extemporaneously prepared) gives color reactions with various metals. Reagent is prepared by heating 2 Gm. uric acid with 2 Cc. HNO_3 (40° Bé.), and when the reaction is over adding 2 Cc. water, heating until solution is perfected, and then making up to 100 Cc. A few Ccs. of reagent with a little solut. of a ferrous salt and a drop or two of KOH solut. gives a fine blue changing to light yellow (sensitive 1 : 100,000). On boiling reagent with *zinc* a yellow to orange color develops, depending on quantity of zinc present. With *magnesium* a carmine color develops. *Cadmium* gives a grenadine tint. *Iron* gives a brownish-

yellow. *Nickel* and *cobalt* give an orange. *Manganese* affords a carmine-red. For details see MERCK'S REPORT XI, p. 56.

Deniges (NITRATES AND NITRITES). Add 0.5 Cc. of a 1 : 20 antipyrine solut. and 1.5 Cc. of conc. sulphuric acid to 1 Cc. of solut. containing nitrate or nitric acid—a carmine-red color develops. If 3 Cc. acid used, color is at first orange to yellow, but on diluting with water, carmine-red. If nitrous acid present, greenish-blue develops (nitroso-antipyrine)— changed by sulphuric acid to yellow or orange, and on diluting with water to light-yellow. If both nitrates and nitrites present, add 3 or 4 drops sulphuric acid to mixture, heat, then cool, and add 0.5 Cc. 1 : 20 antipyrine solut.—a greenish-blue or greenish-yellow indicates nitrites. Now add 3 Cc. more acid —an orange color changed to carmine-red on diluting with water indicates nitrates. Chlorates interfere with reaction; if these present, add 4 drops acid and 2 drops sodium-bisulphite solut. to 1 Cc. of solut. to be tested and proceed as above.

Deniges (NITRITES). 1.—(*a*) Phenol, 1 Gm.; sulphuric acid, 4 Cc.; water, 100 Cc. (*b*) Mercuric acetate 5 Gm. (or oxide 3.5 Gm.); glacial acetic acid, 20 Cc.; water, 100 Cc. Shake for a while, add 0.5 Cc. sulphuric acid, and filter. To use, mix 2 Cc. each of *a* and *b*, boil, and add 1 or 2 drops of solution to be examined—if 0.5 Gm. nitrite per liter present, an immediate red develops; if solution so dilute that color develops slowly, add 1 to 10 Cc. to reagent and boil. Reagent unaffected by light, air, nitrates, chlorates, hypochlorites, hypobromites, chlorine, bromine, etc. 2.—Aniline, 2 Cc.; glacial acetic acid, 40 Cc.; water to make 100 Cc. Boil 5 Cc. of reagent with suspected liquid (0.1 to 10 Cc. according to concentration)—pale-yellow to dark-orange color develops, changed to red by a few drops HCl or H_2SO_4, but restored by sodium hydrate or acetate. Reagent not affected by chlorates or nitrates, but is by hypochlorites, hypobromites, chlorine and bromine. 3.—Resorcin, 1 Gm.; water, 100 Cc.; sulphuric acid, 10 drops. Mix 4 drops of suspected liquid, 2 Cc. sulphuric acid, and 5 drops reagent—a very intense carmine or violet color develops. Chlorates give a green color with the last reagent.

Deniges (TYROSIN). Conc. solut. of aldehyde in sulphuric acid gives with tyrosin a handsome carmine-red condensation product exhibiting absorption bands covering all the green and almost all the yellow of the spectrum.

Deniges (URIC ACID IN URINARY CALCULI). Triturate few pieces of calculi with 5 or 6 Cc. water and 2 drops soda-lye, boil, dilute with equal volume water, and filter. To filtrate add $\frac{1}{8}$ its volume of acid mercury-sulphate solut. (mercuric chloride 5 Gm.; sulphuric acid 20 Cc., water 100 Cc.). If uric acid present, a white flocculent ppt. forms.

Deniges (TIN). Ammonium molybdate, 1 Gm.; water, 10 Cc., sulphuric acid, 10 Cc. Reagent gives a blue color with tin in solution.

Deniges (URIC ACID). Uric acid is converted into alloxan by careful treatment with nitric acid. After evaporating off excess of acid a few drops of sulphuric acid and of benzene containing thiophene are added, when a blue color will be developed by the alloxan.

Desbassins (NITRIC ACID). See *Richmond's* test.

De Souza (HARDENING METHOD). Pyridine is used to harden, dehydrate and clear tissues at the same time. They may be stained after hardening by aniline dyes dissolved in the pyridine, or passed through water and stained by the usual methods.

Deubner (BILIARY PIGMENTS). See *Gmelin's* test.

Deventer (NITRITES). Ferrocyanide of potassium is oxidized to ferricyanide by nitrites (nitrous acid.)

Deville (PHENOL). Ferric chloride gives with carbolic acid a bluish-violet color.

Devoto (PEPTONE). All other albuminoids are precipitated by addition of crystalline ammonium sulphate; peptone is detected in the filtrate by the biuret reaction. According to Bogomolow and Wassilieff, peptone may also be detected in this filtrate by Roch's reagent (salicyl-sulphonic acid) or by means of resorcin and trichloracetic acid.

De Vrij (CHROMATE TEST FOR QUININE). Dissolve 1 Gm. quinine in 45 Cc. boiling water, add 2.5 Gm. neutral potassium chromate, cool to 15° C., and after an hour filter off the crystallized quinine chromate. To 10 Cc. of filtrate add one

drop of soda lye, or until solution reddens phenolphtalein paper. If quinine free from other cinchona alkaloids, solution remains clear, even upon heating; if otherwise, a turbidity ensues.

De Vrij (HERAPATHITE REACTION FOR QUININE). Dissolve 8 parts quinoidine sulphate in 8 parts 5-% aqueous sulphuric acid, and carefully precipitate with an iodine solution (1 part iodine, 2 parts potassium iodide, and 100 parts water). Dissolve precipitate, which, after washing and drying, becomes resinous, in six times its weight of 92- to 94-% alcohol, filter, and evaporate and dissolve residue in five times its weight alcohol. This solution produces with quinine-sulphate solution a precipitate of quinine iodosulphate.

Diesel (OLIVE OIL). Color reactions occur on adding nitric acid to olive oil.

Dieterich (ALOES). Evaporate solution of substance to dryness with a few drops of nitric acid, sp. gr. 1.4, and take up residue with one drop alcohol; on adding alcoholic solution of potassium cyanide, a pink color is given by aloes.

Dieterich (DISTINCTION OF CATECHUS). If Gambier catechu, 3 Gm., is treated with normal potassa solution, 25 Cc., and water 100 Cc., and the solution shaken out with benzene, 50 Cc., the benzene layer is colored intense green. Pegu catechu does not give this reaction.

Dietrich (URIC ACID). Sodium hypochlorite solution containing bromine gives with solution of uric acid an unstable rose-red color.

Di Vetere (CASTOR OIL IN OLIVE OIL). Shake a sample of the oil with concentrated hydrochloric acid—three layers form if castor oil present.

Dobbin (CAUSTIC ALKALI). Reagent is prepared by adding mercuric-chloride solut. to a solut. of 5 Gm. potassium iodide, until permanent precipitate forms. Remove this by filtration, add 1 Gm. ammonium chloride to filtrate, and then sufficient dilute soda lye until a permanent precipitate is again obtained. The filtrate is then diluted to 1 liter. Reagent is applicable for detection of traces of free alkalies in potassium and sodium carbonates. Caustic alkalies,

including ammonia, produce a yellow to reddish-brown color or precipitate, according to the quantity present.

Dodge-Olcott (COPAIBA BALSAM). Add 4 drops of oleoresin to 4 fl. dr. glacial acetic acid, then add 6 drops strong nitric acid —the mixture remains colorless if oleoresin is pure.

Dogiel (METHYLENE-BLUE IMPREGNATION METHOD). Place pieces of tissue in a 4-% solut. methylene blue in 0.75-% salt solution, let remain for a few minutes, then place for half an hour or more in a saturated aqueous solution of ammonium picrate. Finally, wash in fresh ammonium-picrate solution and examine in dilute glycerin.

Dogiel (METHYLENE-BLUE STAINING METHOD). Place objects (pieces of retina, etc.) to be stained in a few drops aqueous or vitreous humor, to which add 2 or 3 drops of 0.06-% solution methylene blue in physiological-salt solution, and expose to air. Stain takes effect in 5 or 10 minutes, and attains its maximum in 15 to 20 minutes, though thicker specimens may require several hours. Reaction may be hastened by placing preparations in a stove kept at 30° to 35° C.

Donath (CHROMIC ACID). In presence of a bichromate, free chromic acid may be detected by violet color imparted to carbon disulphide, added after shaking solution with potassium-iodide solution.

Donath (FREE ACID). A violet color is imparted to carbon disulphide on adding a few Cc. to liquid containing free acid, after the addition of a little potassium iodide and some bichromate.

Donath (NITROGEN). Heat 0.05 Gm. of substance with 1 Gm. potassium permanganate, and 20 Cc. of pure, saturated potassa solution to boiling, and if necessary add more permanganate until coloration permanent. On cooling, dilute mixture with water, decompose excess of permanganate by the addition of alcohol, remove precipitate by filtration, and test filtrate for nitric acid by usual methods.

Donath (POTASSIUM BICHROMATE). A brown cloudiness or precipitate develops on bringing a solut. of sodium thiosulphate to boiling-point and adding an equal volume of previously heated liquid containing potassium bichromate, if chromate present.

Donath (POTASSIUM CHROMATE). Heavy blackish-brown precipitate forms on boiling a liquid containing potassium chromate in the presence of bichromate and adding a drop of manganese-sulphate solution.

Donath (RESIN IN WAX). 1.—Boil 0.8 Gm. of sample, and for comparison the same quantity of pure wax, with 10 Cc. conc. nitric acid, until no more red fumes are evolved; then cool, saturate with ammonia, and filter. 2.—Heat wax with 4 or 5 times as much nitric acid (sp. gr. 1.33) to boiling for one minute, then add an equal volume of cold water and an excess of ammonia—if wax pure, the filtrate will be pure yellow; with resin, it will be blood-red or reddish-brown. The addition of 1 per cent. of resin may be detected by this test.

Donath (SULPHURIC ACID). Carbon disulphide is colored violet on boiling vinegar containing sulphuric acid with lead chromate, then filtering, and proceeding as in Donath's test for free acid.

Donath (TARRY MATTER). Ammonia containing tarry matter, on being supersaturated with sulphuric acid, reduces a solution of potassium permanganate.

Donath-Mayrhofer (GLYCERIN). When glycerin is present in a liquid a carmine color is produced on evaporating to dryness, carefully heating to 120° C. with 2 drops phenol and sulphuric acid, extracting with water, and adding ammonia to residue.

Donath-Schmidt (RESIN IN WAX). Boil 5 Gm. wax with 20 to 25 Gm. crude nitric acid (sp. gr. 1.32-1.33) for 1 minute, add equal volume water, then excess of ammonia. Pour ammoniacal fluid off—if wax pure, color of latter is only yellowish; if even 1% resin present, color will be more or less reddish-brown.

Donne (PUS IN URINE). Add fragment of caustic soda to sediment collected in a conical glass by allowing to deposit and then pouring off the supernatant liquid, and stir—pus is colored greenish and gelatinizes as a lumpy mass; a sediment of mucus is partially dissolved with formation of a flocculent precipitate.

Donny (LEGUMINOUS FLOUR IN WHEAT FLOUR). The moistened end of a glass rod bearing some of the flour is introduced into the vapors of nitric acid arising in a test-tube, after

which the rod is introduced into an atmosphere of ammonia —leguminous flour is thus colored a purple-red; wheat flour only yellow.

Doutrelepont-Schutz (SYPHILIS BACILLUS STAIN). Place in solut. of fuchsine in 1-% aq. solut. methylene-violet for 24 to 48 hours, decolorize in dil. HNO_3 (1:15) several seconds, place in 60-% alcohol 5 to 10 min., and when pale-blue place in weak, transparent aq. solut., safranine for a few minutes; the intensely red section is next placed in 60-% alcohol several seconds, then rinse in absol. alcohol for a. moment, dehydrate, clear in cedar oil, and mount in balsam. The bacilli are blue, the nuclei and tissue light-red, and round cells (Ehrlich's cells) are blue with red nuclei.

Dragendorff (ALCOHOL IN VOLATILE OILS). Metallic sodium added to the oil in question generates hydrogen if alcohol is present, and produces a brownish color.

Dragendorff (ALKALOIDS). Potassium and bismuth iodide. Bismuth iodide is heated with a potassium-iodide solution, the mixture filtered while hot, and to the filtrate an equal volume of cold concentrated potassium-iodide solution is added. The concentrated solution is permanent, the dilute solution not. According to *Frohn* the reagent is prepared by suspending 1.5 Gm. freshly precipitated bismuth subnitrate in 20 Gm. water, heating the mixture to boiling, and adding 7 Gm. potassium iodide and 20 drops hydrochloric acid. The reagent gives a reddish-brown precipitate with alkaloids, but also with albuminous bodies. *Kraut's* modification: Dissolve bismuth subnitrate, 80 Gm., in nitric acid, 200 Cc., and add solut. slowly to potassium iodide, 277 Gm., dissolved in little water. Cool quickly, filter from potassium nitrate crystals, and make up to 1 liter. Keep in the dark. See *Mangini's* and *Thresh's* tests.

Dragendorff (BENZIN; BENZENE). Benzene is distinguished from benzin by forming nitrobenzene by action of fuming nitric acid.

Dragendorff (BILIARY PIGMENTS). See *Gmelin's* test.

Dragendorff (CODEINE). Codeine dissolves in warm Fröhde's reagent with yellowish, then deep-green, finally deep-blue color.

Dragendorff (CURARINE). 1.—Particle dissolved in 2 to 3 Cc. dilute sulphuric acid (1:50) gives on evaporating at 40° C. a handsome red color lasting 1 to 2 hours. 2.—Add fragment of potassium bichromate to solut. of alkaloid in conc. sulphuric acid—a fine blue color develops, only gradually changing to a long persisting red (with strychnine the red rapidly disappears).

Dragendorff (DIGITALIN). 1.—Conc. sulphuric acid dissolves digitalin, and solut. is brown-red, changing in 12 to 20 hours to cherry red; on exposure of solut. to bromine vapors it is colored violet-red. (*Otto* adds bromine water to sulphuric acid solut. with similar results.) On adding few drops water, permanent green color develops. 2.—Anhydrous chloral colors digitalin yellowish, then green; on warming to 60-70° C. violet; at higher temperature, deep blackish-green. 3.—Few drops of digitalin solut. with few drops diluted solut. ox-gall and some conc. sulphuric acid gives handsome red color (other glucosides do also).

Dragendorff (ELATERIN). With conc. sulphuric acid, elaterin gives at first a yellow, then handsome red color.

Dragendorff (BRUCINE). Dissolve particle in 10-% sulphuric acid and add a little very dilute potassium-bichromate solution—red to brownish-orange color develops.

Dragendorff (NARCEINE). Zinc potassio-iodide affords a blue color.

Dragendorff (NITROBENZENE). Add 4 drops alcohol and trace of sodium to 10 drops essential oil almond—mixture becomes deep-brown and viscid if nitrobenzene present.

Dragendorff (PHENOL IN URINE). Extract phenol by means of petroleum naptha, and test as usual.

Dragendorff (SOLANINE). Firm jelly forms on dissolving solanine in hot amylic alcohol.

Dragendorff (STRYCHNINE). Iodic acid gives reddish-brown color with strychnine.

Dragendorff (TURPENTINE). Essential oils containing turpentine become turbid on addition of alcohol.

Draper (CASTOR OIL). Evaporate essential oil supposed to contain castor oil to a small bulk in a porcelain capsule, treat with one-fourth its original bulk nitric acid, subsequently

neutralize acid solution with sodium carbonate solution by heating to boiling—if castor oil present an odor like that of œnanthol is evolved.

Drechsel (BILIARY MATTER). A red to reddish-brown color develops on adding to the concentrated liquid syrupy phosphoric acid and a little cane sugar, and heating on a water-bath. See *Pettenkofer's* reaction.

Drechsler (ALCOHOL). Add 3 drops of solution of 1 part potassium bichromate in 10 parts nitric acid (sp. gr. 1.30) to 5 drops of essential oil supposed to contain alcohol, and note change in color.

Drewsen (ACETONE IN URINE). See *Bayer's* test.

Drouin-Potain (CARBONIC OXIDE IN AIR). See *Potain-Drouin.*

Drouot (MARGARIN IN BUTTER). Melt sample—butter is transparent, margarin turbid. Bischoff has recently described an apparatus for this purpose (and Jahr also), whereby behavior of melted fat, when shaken with warm water, can be observed. Margarin rapidly separates from the water, whereas the butter is completely emulsified.

Dryer (TIN). A purple color develops on adding to a liquid containing tin a few drops of a solution of 0.1 Gm. brucine, 1 Cc. of nitric acid, and 50 Cc. water heated to boiling-point and cooled.

Dudderidge (PEROXIDES). Add silver-nitrate solut. to powder in test-tube—if alkali peroxide present, oxygen evolved, recognized by glowing match-stick, and metallic silver deposited. With alkali earths reaction is slower, brown silver oxide being first deposited, changing to metallic (black) silver.

Dudley (GALLIC ACID). A reddish color, changing to green, develops on adding a solut. ammonium picrate to gallic acid.

Dudley (GLUCOSE). Dissolve bismuth subnitrate in a little nitric acid, add equal volume of acetic acid, and dilute solution with water to 10 times its volume. The urine to be tested is made alkaline, a few drops of the reagent are added, and the mixture boiled for 20 or 30 seconds—if glucose present the reduced bismuth compound is deposited as a black precipitate. See *Almén's and Boettger's* tests.

Duflos (ANILINE REACTION). With dilute sulphuric acid and a little lead- or manganese peroxide, aniline gives a greenish coloration.

Duflos (FREE ACIDS). Evaporate 10 to 12 drops of acid solut. in a porcelain dish on water-bath, and add a fragment cane sugar —free H_2SO_4 gives greenish-black spot; free HCl gives brownish-black spot; free HNO_3 gives yellowish-brown spot.

Duflos (PICROTOXIN). A green color develops on adding a solution of potassium bichromate to picrotoxin.

Dumontpallier (BILIARY PIGMENTS). This is Smith's modification of Maréchal's test.

Dumontpallier-Trousseau (BILIARY PIGMENTS). Add a few drops tincture iodine to the urine—if biliary pigments present, an emerald-green color develops, even in dilute solutions. On overlaying the tincture on urine a green zone forms. Bromine water gives a similar reaction.

Dunham (CLEARING MIXTURE). Mix 3 or 4 parts of white thyme oil with 1 part of clove oil.

Dunham-Bujwid (ASIATIC CHOLERA BACILLUS). See *Bujwid-Dunham.*

Dunstan-Ransom (ALKALOIDS IN BELLADONNA EXTRACT). Dissolve about 2 Gm. extract in water acidulated with hydrochloric acid with gentle heat; filter, wash with dilute hydrochloric acid until no alkaloidal reaction given by filtrate. Make the filtrate alkaline with ammonia, wash out twice with chloroform, shake out twice with acidulated water, again make alkaline, and remove alkaloid with two successive washings of chloroform, then evaporate the solvent, and dry at 100° C.

Dunstan-Short (NUX-VOMICA ASSAY). Extract 5 Gm. crushed nux vomica seeds by continuous percolation with 30 Cc. chloroform + 10 Cc. strong alcohol. Wash out twice with 25 Cc. dilute sulphuric acid. Make alkaline with ammonia water and wash out alkaloids with chloroform, then evaporate to dryness at 100° C. and weigh residue.

Dunstan-Short (SEPARATION OF STRYCHNINE FROM BRUCINE). Dissolve 0.2 Gm. or less of mixed alkaloids of nux vomica in 10 Cc. dilute sulphuric acid (5-%), dilute solution to 175 Cc. with water, then make up to 200 Cc. with potassium-ferrocyanide solution (5-%). Let stand 6 hours with occasional stirring, collect precipitate, wash with water acidulated with sulphuric acid (0.25-%) until washings free from bitterness. The precipitate is then decomposed with strong ammonia, the

filter washed with the liquid, and finally with chloroform, the ammoniacal solution being extracted with chloroform, and the solvent carefully evaporated in a tared flask, dried and weighed as strychnine.

Dupasquier (ORGANIC MATTER IN WATER). Organic matter in water is shown by a bluish-violet color upon boiling with aqueous solution of gold chloride, due to reduction of the gold or by the formation of a gold mirror.

Dupin-Crouzel (ANIMAL AND VEGETABLE FATS IN PETROLEUM). See *Crouzel-Dupin*.

Dupré (FOREIGN COLORING MATTERS IN WINE). A colorless 10-% gelatin jelly is cut into cubes and allowed to stand in the wine for 24 hours. On removal the cube is cut in half. Natural wine colors only penetrate short distance into the cube. Foreign colors dye it throughout greater part.

Durien (CROTON OIL IN TINCTURE IODINE). Mix 10 Gm. tincture with 70 Gm. water, add iron filings in excess to the pptd. I, and shake the solut. when decolorized, with ether. Evaporate ethereal solut. and test residue (odor, action on skin, and brown color with H_2SO_4).

Durig (FORMALDEHYDE MIXTURE). A 3-% potassium-bichromate solution containing 4 to 6% formaldehyde.

Dusart-Blondlot (PHOSPHORUS IN TISSUES). Treat substance with mixture of alcohol, ether and carbon disulphide containing 0.5% sulphur, let stand 1 day. Repeat operation twice more, mix liquids, and warm with metallic copper. Collect copper (phosphide) and proceed as with Marsh's test.

Duval (CARMINE AND ANILINE-BLUE METHOD). Stain with carmine, dehydrate sections, and stain for a few minutes in mixture of 10 drops saturated alcoholic solution aniline-blue with 10 Gm. absolute alcohol. Clear with turpentine without further treatment with alcohol, and mount in balsam.

Duval (IMBEDDING PROCESS). Objects are imbedded in celloidin solution or collodion, after thorough dehydration with absolute alcohol.

Duval (UNROLLING SECTIONS). Float the rolled sections on the surface of warm water or alcohol in a watch-glass, or, place them on a layer of water on a glass slide, and heat the latter to 45° or 50° C.

Duyk (GLUCOSE). Dissolve 5 Gm. nickel sulphate and 3 Gm. tartaric acid in 75 Cc. dist. water, and add 25 Cc. solut. NaOH (sp. gr. 1.33). In use, dilute with an equal vol. water, and add 1 or 2 Cc. of the saccharine solut. Heat to 100° C.—the slightest quantities of glucose are indicated by a reddish-brown turbidity, increasing in intensity until in a few minutes a voluminous, dark reddish-brown, sometimes black, ppt. forms.

Dwar (CINCHONA ALKALOIDS). Dissolve alkaloids in alcohol, and add one drop diluted sulphuric acid, followed by tincture iodine, drop by drop—iodosulphates of the alkaloids are precipitated, and are distinguishable from one another by difference in appearance.

Eber (DECOMPOSED SAUSAGE). Hydrochloric acid 1; alcohol 3; ether 1. A small piece of sausage is held over a few drops of reagent in a wide test-tube—if sausage decomposed a cloud forms (due to ammonia).

Ebner (DECALCIFICATION FLUIDS). 1.—100 Cc. cold saturated aqueous solution sodium chloride, 100 Cc. water, and 4 Cc. hydrochloric acid. Preparations are placed in the fluid, and 1 to 2 Cc. hydrochloric acid added daily until they are soft. 2.—2.5 parts hydrochloric acid (sp. gr. 1.16), 500 of alcohol (90-%), 100 water, and 2.5 sodium chloride.

Eboli (ALKALOIDS). Dil. sulphuric acid (1 : 1) and potassium bichromate give characteristic color-reactions. (See *Am. Jour. Pharm.*, xxix, p. 369).

Eboli (CANTHARIDIN). Heat solut. with sulphuric acid and potassium bichromate—handsome green color develops if cantharidin present.

Ebstein-Muller (PYROCATECHIN IN URINE). Add a few drops urine to a few drops very dilute ferric-chloride solut. in a watch-glass—if pyrocatechin present, an emerald-green color develops. On contact with ammoniacal vapors the liquid becomes violet. On adding a trace of acetic acid to solut. the emerald-green is restored.

Edelmann-Braeutigam (HORSE MEAT). See *Braeutigam-Edelmann.*

Edlefsen (CHLORIC ACID IN URINE). Warm urine with ¼ its vol. conc. hydrochloric acid. The indican always present

imparts a dark-red to brownish color, but at near the boiling-point any chloric acid present causes decolorization of the solut. to a light-brown or light-yellow color; solut. finally becomes colorless. If insufficient indican present, add a few drops indigo solut.

Edlefsen (NAPHTALIN). 1.—A few drops ammonia water or sodium-hydrate solution causes fluorescence in a solut. containing naphtalin. 2.—Add 3 or 4 drops solut. calcium chloride and a few drops of conc. hydrochloric acid to liquid—a lemon-yellow color develops. Extract this with ether and overlay extract on a 1-% aqueous solut. resorcin, adding a little ammonia—a bluish-green develops, changed by nitric acid to cherry-red.

Edlefsen (PHENETIDIN IN URINE). Boil urine with hydrochloric acid, cool, and add a few drops 1-% solut. sodium nitrite. To one-half this mixture add a few drops 5-% solut. alpha-naphtol, and soda-lye to alkalinity—a red color develops changing to reddish-violet with excess of hydrochloric acid. To other half of mixture add a few Cc. 3-% solut. carbolic acid, and soda-lye to alkalinity—a yellow color develops changing to pale-red with excess of hydrochloric acid.

Ehler (FIXING FLUID FOR ANNELIDS). Add 1 to 5 drops glacial acetic acid to 100 Cc. 0.5- to 1-% chromic-acid solut.

Ehrenbaum (IMBEDDING METHOD). Objects are penetrated by a mixture of ten parts resin and 1 part of wax. Sections are obtained by grinding in the usual way, and the imbedding mixture is afterwards removed by treating successively with turpentine and chloroform.

Ehrlich (ACID HEMATOXYLIN). Dissolve hematoxylin, 2 Gm., in absolute alcohol, 100 Cc., and add glycerin, 100 Cc.; distilled water, 100 Cc.; ammonia alum, 2 Gm.; glacial acetic acid, 10 Cc. Expose to daylight for at least a month before use, removing the stopper at intervals.

Ehrlich (ACIDOPHILOUS MIXTURE). 1.—Indulin, aurantia, and eosine, of each 2 parts; glycerin, 30 parts. 2.—Sat. aqueous solut. methyl orange G., 125 Gm.; sat. aqueous solut. fuchsine S., 150 Gm.; sat. aqueous solut. methyl green, 125 Gm.; dist. water, 300 Gm.; glycerin, 100 Gm.; alcohol, 200 Gm. Preserve in amber-colored bottles.

Ehrlich (AMMONIATED HEMATOXYLIN). Dissolve ammonium carbonate, 0.4 Gm., and hematoxylin, 2 Gm., in 50-% alcohol, 40 Cc., and expose to air in a shallow dish for 24 hours. Make up volume to 40 Cc. with 50-% alcohol (warming if necessary to re-dissolve any separated crystals), and add ammonia alum, 2 Gm., dissolved in distilled water, 80 Cc.; glycerin, 100 Cc.; alcohol, 80 Cc., and glacial acetic acid, 10 Cc.

Ehrlich (DIAZO-REACTION). Test for pathologically changed urine by means of diazo-benzenesulphonic acid. Reagent is always freshly prepared as follows: (*a*) Sulphanilic acid, 5; hydrochloric acid, 50; distilled water, 1000; (*b*) sodium nitrite, 0.5; water, 100. For use add 6 Cc. of solut. *b* to 250 Cc. of solut. *a*. According to more recent statements a diazo-benzenesulphonic acid (1:60) is employed as Ehrlich's reagent. *Pentzoldt* (*q. v.*) utilizes the reaction for detection of glucose upon the addition of potassa.

Ehrlich and others employ it for the diagnosis of various diseases (upon addition of ammonia), especially for the detection of biliary pigments. Urine is tested according to different methods: 1.—Equal volumes of urine and reagent are mixed, and ammonia (one-eighth volume) added. In cases of typhoid, pneumonia, and measles, solution assumes a red color readily recognizable in the foam when solut. is shaken. 2.—In *Charité's* modification, for detection of biliary pigments, Ehrlich's reagent is added to urine diluted with an equal vol. dil. acetic acid. The resulting dark color is converted into violet by glacial acetic or other acid. 3.—The urine to be tested is shaken with chloroform, and 1 to 2 volumes of Ehrlich's reagent added with sufficient alcohol to make the mixture homogeneous. If bilirubin present a red color develops, which on careful addition of conc. hydrochloric acid changes to violet and blue. Upon addition of potassa solution three zones form, a greenish-blue lower one, a pure blue upper zone, and a reddish band between.

Ehrlich (DAHLIA STAIN). Add to an aqueous solut. of dahlia 5% acetic acid; or, stain in a neutral solut. and wash out with acidulated water. Dehydrate with alcohol and mount in resin-turpentine solution.

Ehrlich (GENTIAN-VIOLET SOLUTION FOR STAINING BACTERIA). 1.—Shake 4 Cc. aniline with 100 Cc. distilled water, and separate undissolved aniline by filtration through a moist filter. To filtrate add 11 Cc. conc. alcoholic solut. gentian violet while shaking, and let mixture stand for 24 hours. 2.—Gentian violet, 1 part; alcohol, 15 parts; aniline, 3 parts; water, 80 parts.

Ehrlich ("MASTZELLEN"). An almost saturated solution of dahlia in the following mixture: Absolute alcohol, 50 Cc.; water, 100 Cc.; glacial acetic acid, 12.5 Cc. Tissues are well hardened in strong alcohol, placed for at least 12 hours in the above, then washed out in alcohol, and mounted in resin-turpentine solution.

Ehrlich (STAINING METHOD). Use a saturated aqueous solut. aniline as a mordant, the dye being dissolved in this or added in the form of a conc. alcoholic solut. till a slight opacity appears.

Ehrlich ("TRIACID" MIXTURE). Mix saturated solutions of orange G., 120 parts; acid fuchsine, 80 parts, and ethyl green, 100 parts; then add distilled water 300 parts; absolute alcohol, 180 parts; glycerin, 50 parts.

Ehrlich-Biondi [*Ehrlich-Biondi-Heidenhain*] (STAIN). (*a*) Methyl green, 0.5 Gm.; distilled water, 100 Cc.; (*b*) acid fuchsine, 0.5 Gm.; distilled water, 40 Cc.; (*c*) orange, 2 Gm.; distilled water, 200 Cc. Mix the three solutions and filter before use. Stain sections for 12 hours, then wash, dehydrate, clear, and mount.

Ehrlich-Biondi-Heidenhain. See *Ehrlich-Biondi.*

Ehrlich-Weigert-Koch (ANILINE WATER). Mix 100 Cc. aniline-water (1 : 30) with 11 Cc. conc. alcoholic solut. gentian violet, methyl violet, or fuchsine, and 10 Cc. absolute alcohol.

Einbrodt (AMMONIUM SALTS). Solut. mercuric chloride made slightly alkaline with potassium hydroxide or carbonate produces a white turbidity or ppt. with ammonium salts.

Einhorn (SUGAR IN URINE). Formation of carbonic acid upon treating urine with yeast is certain indication of glucose in urine. *Einhorn* and others (v. *Arndt*) have constructed special fermentation saccharometers, which permit exact quantitative estimations.

Eiselt (MELANIN IN URINE). Urine containing melanin acquires a dark color on treatment with oxidizers (*e. g.*, nitric acid alone or with potassium bichromate and H_2SO_4).

Eisig (FIXING SOLUTION). Mix equal parts of 0.25-% platinum-chloride solut. and 1-% chromic-acid solut. Pelagic fish ova are left in this for 1 or 2 days.

Eismond (QUIETING INFUSORIA). Add to water containing the organisms a drop thick aqueous solut. of cherry-tree gum.

Elias (ALKALOIDS). Formaldehyde-sulphuric acid gives the following various color reactions with alkaloids: *Narcotine*, violet, changing to olive-green and finally yellow; *papaverine*, wine-red, changing from the margin inwardly to yellow and finally deep-orange.

Elram (ETHEREAL OILS, AND RESINS). A 1-% solut. vanillin in sulphuric acid gives color reactions as follows: *Maracaibo bals. copaiva*—intensely dark orange-red color, margins violet, and color changing slowly to violet; *Gurjun balsam*—a similar color, but without the violet, and changing in 2 to 4 hours to dark-brown; *oil copaiva*—reddish-violet changing rapidly to dark reddish-brown; *copaivic acid*—like Maracaibo copaiva; *colophony*—a reddish-brown, changing to bluish-violet; *camphor*—pink, changing in 24 hours through red, reddish-violet and dirty gray.

Elsching (CELLOIDIN SOLUTION). Allow celloidin shavings to swell for 24 hours in necessary quantity absolute alcohol, then add proper amount of ether.

Emden, Van- (DUBOISINE). Solut. bromine in potassium-bromide solut. gives yellow ppt. with dil. solut. duboisine; iodopotassium iodide gives brownish-red ppt.; sodium phosphomolybdate gives voluminous ppt., soluble on warming, and reprecipitated on cooling; solut. of sodium phosphomolybdate in nitric acid gives yellow ppt.

Emery (AQUEOUS CARMINE INJECTION). Add acetic acid to a 10-% ammoniacal solut. carmine with continual stirring, until mixture becomes blood-red. Pour off supernatant clear solut. and inject cold without further preparation.

Enell (GURJUN OIL IN COPAIVA). Add 8 drops of balsam to be tested to mixture of 2 drops conc. sulphuric acid and 4 Cc. acetic acid—no red or violet color should develop within 15

minutes, and on addition of 1 drop water, no red ppt. should form on shaking.

Endemann-Prochazka (COPPER). Add 1 drop conc. hydrobromic acid to 1 drop of solut. of salt or ash in a watch-glass—on standing for some time, a rose-red to reddish-brown color is developed by minutest trace of copper.

Engel (CREATININE). 1.—Add a little silver-nitrate solut. to creatinine solut., then potassa-lye by drops—white ppt. forms, soluble in excess of KOH; becomes gelatinous and blackens gradually in the cold, quickly on heating. 2.—To a cold solut. creatinine containing potassa, add cold solut. mercuric chloride—the compound $C_4H_7HgN_3O_2$ is obtained.

Engel-Ville (INDICATOR). Poirrier Blue C4B. Gives with carbonates a blue color; with caustic alkalies, a red; and with acids a blue color.

Entz (METHOD FOR INFUSORIA). Add a few drops Kleinenberg's liquid to a watch-glass water containing the organisms. Remove liquid after 1 or 2 minutes, and wash objects for half-an-hour with alcohol of medium strength; then stain 10 to 20 minutes in picro-carmine solution, wash with water till picric acid is removed, and mount in a mixture of equal parts glycerin and water.

Erdelyi (FOREIGN FATS IN BUTTER). A solut. of 2 Gm. of the fat in 6 Cc. cumene remains unchanged at 0° C. for at least an hour if fat is pure butter.

Erdmann (ALDEHYDES). Dimethylhydro-resorcin affords with aldehydes crystallizable insoluble compounds, which may be identified by analysis and melting-points.

Erdmann (ALKALOIDS). 1.—Mix 6 drops nitric acid (sp. gr. 1.25) with 100 Cc. water, and add 10 drops of this solut. to 20 Cc. pure conc. sulphuric acid. 2.—Dilute 10 drops nitric acid (sp. gr. 1.185) with 20 Cc. of water, and add 20 drops of this solut. to 40 Cc. pure conc. sulphuric acid. Add 1 Cc. of the reagent to 1 to 2 Mg. of the dry alkaloid in a watch-glass on white paper or in a white porcelain dish, and set mixture aside for $\frac{1}{4}$ to $\frac{1}{2}$ hour at 18° to 22° C. For color reactions, see Hager, *Pharm. Praxis*, 1886, I, p. 208.

Erdmann (POTASSIUM AND RUBIDIUM). Sodium-cobalt nitrite is a sensitive reagent for potassium and rubidium. Re-

agent is prepared by dissolving 30 Gm. cryst. cobalt nitrate in 60 Cc. water, and adding 100 Cc. conc. solut. $NaNO_2$ (= 50 Gm. $NaNO_2$) and 10 Cc. glacial acetic acid. Sensitive to 1 : 10,000 K. Free mineral acid or acetic acid must be absent.

Erdmann-Uslar (ALKALOIDS). Extract with water acidulated with hydrochloric acid, mix with sand, treat with ammonia, and then extract with amylic alcohol. For details see *Am. Journ. Pharm.*, XXXIV, p. 354.

Erlicki (HARDENING FLUID). 2.5 Gm. potassium bichromate; 0.5 Gm. copper sulphate; 100 Cc. water.

Ermengen, Van- (STAINING CILIA AND BACTERIA). Spread cultivations thinly on a clean glass cover, and place for ½ hour if cold, or 5 minutes at 50° C., in fixing solut. (2-% osmic-acid solut. 1; 10- to 25-% tannin solut. containing 4 to 5 drops acetic acid per 100 Cc., 2). Then wash with water and alcohol, put in sensitizing bath (gallic acid 0.5 Gm.; tannin 3 Gm.; fused sodium acetate, 10 Gm.; water, 350 Gm.); and finally wash with plenty water, and dry between filter-paper. Bacteria appear blackish-brown; cilia pure black.

Ernst (BACTERIA NUCLEAR STAIN). Stain with warm, not hot, alkaline methylene-blue solut., wash in water, and after-stain in cold Bismarck-brown solut. Nuclei (sporogenous spots) stain blue-black, thus differentiating from light-blue stained spores.

Ernst (SPORE STAIN). The cover-glass preparation, while still warm from being passed thrice through flame, cover with as much as possible of Loeffler's strongly alkaline methylene-blue solut. Then pass over blue flame of a Bunsen burner until steam arises from it, but do not allow to boil. Rinse in water, and double stain in Bismarck-brown solut. for 1 to 2 minutes, or in very dilute fuchsine solut. Spores are stained blue.

Errera (EXTRACTION OF ALKALOIDS). 5-per-cent. alcoholic tartaric-acid solution.

Esbach (ALBUMIN). 1.—10 Gm. picric acid; 20 Gm. citric acid; 1 liter water. In albuminous solutions (urine) reagent produces, upon previous addition of acetic acid, a yellow ppt. Amount of latter, which can be approximately estimated in

the albuminometer, serves also for quantitative estimation of albumin. 2.—Solut. picric acid (10.5 to 1,000) 8 vol., acetic acid (sp. gr. 1.04), 1 vol. Mix 20 Cc. urine with 20 Cc. solut., heat on water-bath, filter, wash ppt., dry, and weigh; 0.8 of ppt. represents albumin. For Esbach's ureometer, see *Huefner's* test.

Esbach-Gawalowsky (ALBUMIN IN URINE). See *Gawalowsky.*

Eschbaum (SUGAR IN URINE). Place about equal quantities (size of a pea) of phenylhydrazine, HCl, and cryst. sodium acetate in a test-tube, fill with urine, shake until salts dissolve, then place in boiling water, removing heat at once. Allow to cool in the water, preferably over night, then collect ppt. with a pipette and examine crystals microscopically. 0.01-% sugar may be detected.

Eschka (MERCURY). Heat substance in crucible, and condense vapors on a cold glass plate—a white stain is left if mercury was present.

Estcourt-Parry (RESIN, PARAFFIN, AND STEARIN IN WAX). Boil 5 Gm. wax with 20 Gm. nitric acid, cool, dilute with ammonia water—if resin present, an intense red develops.

Wax containing paraffin requires less caustic potassa for saponification than does pure wax; if stearin present, more caustic potassa is required.

Eulenstein (CEMENT). Mix equal parts of Brunswick black and gold size with a very little Canada balsam.

Everard-Demoor-Massart (HEMATOXYLIN-EOSINE). Dissolve alum, 20 Gm., in water, 200 Gm., with heat, then filter, and after 24 hours add a solut. of hematoxylin, 1 Gm., in alcohol, 10 Gm. Let solut. stand for 8 days, filter, and mix with equal vol. of the following solut.: Eosine, 1 Gm.; alcohol, 25 Gm.; water, 75 Gm.; glycerin, 50 Gm.

Everitt (OPIUM). Red color caused by ferric chloride in solutions containing opium is not affected by mercuric chloride. Iron sulphocyanate solution is decolorized under similar circumstances.

Ewald (HYDROCHLORIC ACID IN GASTRIC JUICE). Mohr's solut. (q. v.) diluted with 3 vol. of water. Place a few drops with 1 or 2 drops gastric juice in a porcelain dish—if hydrochloric acid present, a faint violet color appears at point of con-

tact of liquids, and on stirring, mixture becomes brown. See also *Siewer's* test.

Eyclesheimer (CLEARING MIXTURE). Equal parts bergamot oil, cedar oil, and carbolic acid.

Eykmann (PHENOL). A very dilute phenol solution gives, upon addition of a few drops spirit nitrous ether, and overlaid on conc. sulphuric acid, a red zone-reaction.

Eykmann (THYMOL IN MENTHOL). Dissolve a little of the substance in 1 Cc. glacial acetic acid, add 5 or 6 drops sulphuric acid, then 1 drop nitric acid—thymol indicated by blue color.

Fabre-Domergue (GLUCOSE MEDIUM). Mix glucose syrup (sp. gr. 1.1968) 1,000 parts, methyl alcohol 200 parts, glycerin 100 parts, and saturate with camphor. If acid, the medium should be neutralized with potassa or soda.

Fabris-Villavecchia (SESAME OIL). 2 Gm. furfurol dissolved in 100 Cc. alcohol. Add 0.1 Cc. of solut. to 10 Gm. of oil with 1 Cc. hydrochloric acid, shake, then add 10 Cc. chloroform. The oil dissolves in the chloroform, and the aqueous layer, even if less than 1% sesame oil had been present, acquires a handsome carmine-red color. If sesame oil absent, no color develops; if rancid olive oil present, a greenish color forms. Reaction very sensitive and characteristic.

Faby (CODEINE). Rub trace of codeine with 2 drops solut. sodium hypochlorite, and add 4 drops conc. sulphuric acid—a blue color develops.

Fages (CHLORATES AND BROMATES). Add to 1 Cc. solut. strychnine nitrate in 24 Cc. HNO_3 sp. gr. 1.330 a few drops of a solut. of a chlorate or bromate, and concentrate solut.—a red color develops, either at once, or within 15 to 20 minutes. 1 drop of a solut. containing 0.1 Mg. $KClO_3$ gives the reaction in 5 minutes. For details see MERCK'S REPORT, X, p. 120.

Fairbanks (PHOSPHORUS IN IRON). Test solut. is a filtered solution of molybdic acid 100 Gm., water 400 Cc., and ammonia 80 Cc., added to a mixture of nitric acid (sp. gr. 1.42) 300 Cc. and water 700 Cc.

Fairthorne (CHLORAL). Blue color forms on heating chloral with conc. solut. potassium bichromate and adding nitric acid.

Fairthorne (MORPHINE). Dark-red color develops on adding to morphine a solut. of sodium hypochlorite and then ammonia.

Faktor (REAGENT). Sodium thiosulphate gives the following reactions:

I.—BY THE DRY WAY

Manganese Salts.—On ignition with thiosulphate they suffer intumescence, and yield MnS soluble in acids, and also evolve H_2S.

Antimony Salts.—On being heated with the reagent they afford an orange-red mass which on further ignition becomes blackish-gray and becomes superficially coated with a white layer of oxide.

Cadmium Salts.—These, on ignition, afford at first a yellow sulphide which later becomes brownish-red, and on cooling, again yellow.

Stannous Salts.—These on being heated with the reagent afford a dark-brown sulphide.

Potassium Chromates.—These give a green to brownish-green chromic oxide.

II.—BY THE WET WAY

Thallium Salts.—In alkaline solution and at the ordinary temperature they give a white ppt. soluble on heating. On adding acetic acid to the solution black Tl_2S ppts.

Molybdenum Salts.—These afford no reaction; on adding HCl however, a dark-blue ppt. forms.

Tungsten Salts.—On heating these give with thiosulphate no color reaction. On adding HCl, however, a white ppt. forms while the fluid acquires a blue color. If HNO_3 is added instead of HCl the liquid becomes dark-blue.

Chromic Acid affords with the thiosulphate a brown ppt., while the liquid is colored yellow from the chromate formed.

Mercuric Oxide gives a ppt. of black sulphide on warming with the reagent.

Mercuric Sulphide on warming with thiosulphate acquires a fiery-red color.

Minium acquires a darker color on being warmed with thiosulphate solution.

Falk (BLOOD). Add water to a mixture of alcohol 20 Gm., chloroform 20 Gm., oil turpentine containing ozone 20 Gm., and acetic acid 2 Gm., till permanent turbidity, then triturate solut. with a little guaiac resin. Reagent gives a blue color with blood. See also *Almén's* test.

Faris (GLYCERO-GUM). Acacia, 2 oz.; glycerin, 1½ oz.; water, 1½ fl. oz.; thymol, 1 Gm. Dissolve with heat and filter.

Farrant (MEDIUM). According to Squire dissolve acacia, 130 Gm., in a solut. arsenous acid, 1 Gm., in distilled water, 200 Cc., with frequent stirring, then add glycerin, 100 Cc., and filter through fine Swedish paper, upon which has been deposited a thin layer of talc. Sometimes 1% formic acid (sp. gr. 1.2) is added. Altschul says the medium should consist of 1 part acacia, 1 of glycerin, and 1 of conc. aqueous solut. arsenous acid.

Faulding (CINEOL IN EUCALYPTUS AND CAJUPUT OILS). Add 10 or 20 Gm. of oil to phosphoric acid (sp. gr. 1.75) gradually added with constant stirring till no more solidification occurs and slight color appears. Press magma strongly between filter-paper, transfer dry cake to a graduated cylinder, add water, and measure or weigh cineol which separates.

Faure (NATURAL WINE COLORING MATTER). If 10 drops of a 2-% tannin solut. and 6 drops of a 2-% gelatin solut. are added to 2 Cc. red wine, the natural coloring-matter of wine is completely precipitated; coal-tar dyes remain in solution.

Fayollé-Villiers (ALDEHYDES AND KETONES). See *Villiers-Fayollé*.

Fehling (SUGAR, AND OTHER REDUCING SUBSTANCES). *a.*—Dissolve 34.669 Gm. crystallized, not effloresced, copper sulphate in water and dilute solut. to 500 Cc. *b.*—Dissolve 173 Gm. crystallized Rochelle salt and 50 Gm. caustic soda in sufficient water to make 500 Cc.

Mix equal vol. of *a* and *b*, dilute with 5 parts of water, heat to boiling, and gradually add sugar solution (about 1-% strength) —decolorization takes place, red cuprous oxide being precipitated. 10 Cc. Fehling's solution are reduced by 0.05 Gm. grape sugar, 0.067 Gm. milk sugar, 0.0475 Gm. cane sugar, and 0.045 Gm. dextrin or starch, the last three having been previously inverted by boiling with a dilute mineral acid. It

must be remembered, however, that many other substances also reduce Fehling's solution.

According to an older formula, Fehling's solution was prepared as a single solution, and had to be freshly prepared for use each time, as the single solution does not keep long. Solutions identical with or similar to Fehling's reagent are *Barreswil's*, *Frommherz's*, *Trommers'*, *Violette's* and *Worm-Mueller's* solutions (q. v.).

Fenton (TARTARIC ACID). Tartaric acid gives a violet color on addition of solut. ferrous chloride or sulphate with 1 or 2 drops hydrogen dioxide and excess of free alkali.

Ferraro (RESORCIN; SANTONIN; VERATRINE). A little of the substance is burned in a glass saucer with a few drops sulphuric acid and alcohol in excess. *Santonin*—residue is uniform and a characteristic brick-red; *resorcin*—residue at first olive-green, changing quickly to light blood-red with characteristic yellow zones; *veratrine*—residue is uniform violet-red. (For details see Merck's Report, vol. iv, p. 10.)

Ferreri (PHLOROGLUCIN MIXTURE). Dissolve phloroglucin, 1 Gm., in hydrochloric acid, 10 Gm., and water 100 Gm., with heat, and after cooling add 200 Gm., 70-% alcohol.

Ferrier (BLOOD). Dissolve fuchsine, 1 Gm., in distilled water, 150 Cc., and rectified spirit, 50 Cc., then add 200 Cc. glycerin.

Fiebig (SUGAR ESTIMATION BY FERMENTATION GLUCOSOMETER). See *Einhorn's* test.

Field (BISMUTH). Solutions of lead salts containing trace of bismuth afford an orange-red or crimson ppt. (in scales) instead of a yellow one on adding potassium-iodide solut.

Filhol (ALKALIES). Sodium nitroprussiate in the presence of sulphuretted hydrogen gives a blue color with alkalies.

Filhol (IODINE). Evaporate solut. to dryness with potassa, take up with alcohol, again evaporate, dissolve residue in water, add a few drops hydrochloric acid, then some chromic acid—on now shaking with carbon disulphide, latter is colored violet.

Filsinger (BUTTER). Same as *Drouot's* test (q. v.).

Filsinger (CACAO OIL). Modified ether test. Shake 2 Gm. of the oil in a graduated tube with 6 Cc. of a mixture of 4 parts ether (sp. gr. 0.725) and 1 part alcohol (sp. gr. 0.810) and set

aside—pure oil yields a clear solut. that does not become turbid at 0° C.

Finkelburg (EXCREMENTS IN SOIL AND WATER). Alkaline solution of silver oxide with sodium thiosulphate. When substances containing excrements are boiled with hydrochloric acid for several minutes, then make alkaline with soda and again heated to boiling with the reagent, a dark reddish-brown ppt. forms, while the solut. remains light-brown in color.

Finkener (ADULTERATIONS IN CASTOR OIL). 10 Cc. oil are shaken with 50 Cc. alcohol (sp. gr. 0.829) and 17.5° C.—if turbidity develops which does not disappear when mixture is heated to 20° C., at least 10% foreign oils are present.

Finkle (CHRYSAMMIC ACID). Chrysammic acid gives a violet-red color on adding warm solut. potassium cyanide, potassium carbonate in excess, and water.

Finzelberg (VALERALDEHYDE IN VALERIANIC ACID). Mix 2 Gm. valerianic acid with 3 Gm. ammonia water, add 150 to 200 Cc. water, and shake vigorously—if acid is pure, a perfectly clear solution results; if valeraldehyde present, solut. is opalescent.

Fiora (PHENOL). If an excess of phenol is triturated with oil peppermint, a bluish-green color develops after a time, and disappears on warming, but reappears on cooling. Creosote, guaiacol, resorcin, and other allied bodies do not give the reaction.

Fischer (ALDEHYDES, KETONES, AND CARBOHYDRATES). With phenylhydrazine difficultly soluble condensation products are formed. To test for sugar in urine, 50 Cc. of latter are heated with 2 Gm. phenylhydrazine hydrochlorate and 4 Gm. sodium acetate for ½ to 1 hour on a water-bath—phenyl-glucosazone is precipitated. If ppt. is dissolved in alcohol, water added, and the alcohol evaporated, needles of the glucosazone melting at 204° to 205° C. are obtained.

Fischer (HYDROGEN SULPHIDE). A blue color forms on adding to 50 Cc. of a liquid containing hydrogen sulphide 1 Cc. hydrochloric acid, followed by a few grains of para-amidodimethylamine sulphate, and one or two drops of a dil. solut. ferric chloride.

Fischer (PLATINUM). Stannous chloride imparts a red color to a solut. of platinum chloride in hydrochloric acid.

Fischer (SELENIUM). On applying to silver a solution of selenous acid mixed with sulphuric acid, a yellow to brown spot develops.

Fischer (SOAP IMBEDDING MASS). Dissolve 15 parts transparent soap in 17.5 parts 96-% alcohol.

Fischer (STAINS FOR CILIA OF BACTERIA). See *Loeffler's* stain.

Fischer-Phillip (INDICATOR). Dimethylamidoazobenzene; it gives a yellow color with alkalies, and a red with acids.

Fittig (INDICATOR). An ethereal solution of mesityl-quinone is changed from yellow to violet by alkalies.

Fleck (AMMONIA IN WATER). Impregnate strips of white filter-paper with a 10-% solut. lead acetate, and dry in atmosphere free from sulphuretted hydrogen.

Fleischl (BILIARY PIGMENTS). See *Gmelin's* test.

Fleischmann (ALCOHOL). If alcohol present in essential oils or chloroform, a green color develops on shaking well with water, evaporating the aqueous liquid, treating with solution of potassium bichromate, and adding an excess of sulphuric acid.

Fleitmann (ARSENIC). The dil. acid in Marsh's test is replaced by a strong solut. of potassium- or sodium hydroxide, and the arseniuretted hydrogen evolved produces a black stain on paper impregnated with silver nitrate.

Fleitmann (COPPER). The copper solution, freed from nitric acid, bismuth, or lead, is precipitated with metallic zinc, and the ppt. collected, washed, and dissolved in a mixture of ferric chloride and hydrochloric acid. The ferrous chloride formed is titrated with potassium-permanganate solution. Each atom of ferrous iron $(56) = 31.5$ of copper. If the original solution contains nitric acid, bismuth, or lead, the reduction by zinc must be made in the ammoniacal filtrate from the precipitates of these metals; the zinc should be in the form of dust and the solution warmed. When reaction is complete the blue color will have disappeared. The precipitate is then washed with hot water, then with weak hydrochloric acid to remove the zinc, then dissolved in acid and ferric chloride, and titrated as before.

Flemming (FIXING AND HARDENING SOLUTIONS). Chromo-acetic acid is an aqueous solut. of chromic acid, 0.2- to 0.25-% and acetic acid, 0.1-%. Weaker chromo-aceto-osmic acid is an aqueous solut. of chromic acid, 0.25-%; osmic acid, 0.1-%; glacial acetic acid, 0.1-%. The strong solut. consists of 1-% chromic acid solution, 15 parts; 2-% osmic acid, 3 parts; glacial acetic acid, 1 part. Picric acid has sometimes been substituted for chromic acid. Squire gives the following formula: Osmic acid (1-% solut.), 80 Cc.; chromic acid (10-%), 15 Cc.; glacial acetic acid, 10 Cc.; distilled water, 75 Cc.

Flemming (GENTIAN-VIOLET METHOD). Use an alcoholic solut. diluted with about one half its bulk of water. Differentiate stained objects in alcohol containing about 0.5% hydrochloric acid, followed by pure alcohol and clove oil.

Flemming (GLYCERIN PRESERVATIVE). Equal parts of alcohol, glycerin, and water. Lee recommends addition of 0.5 to 0.7% acetic acid.

Flemming (ORANGE METHOD). Stain for days or weeks in strong alcoholic safranine solut. diluted with half its bulk aniline water (saturated); then rinse in distilled water, differentiate in absolute alcohol containing 0.1% hydrochloric acid, stain for 1 to 3 hours in strong aqueous gentian-violet solution, again wash in distilled water, and finally treat with concentrated aqueous solution of orange G. After a few minutes transfer section to absolute alcohol, then clear in clove- or bergamot oil, and mount as usual in dammar or balsam.

Flemming (SAFRANINE SOLUTION). A concentrated solut. in absolute alcohol, diluted with about one-half its bulk water, as above. Follow the same after-treatment.

Flesch (CHROMO-OSMIC ACID). Osmic acid, 0.1 Gm.; chromic acid, 0.25 Gm.; water, 100 Gm.

Flueckiger (ACETANILID). Solutions containing acetanilid give with solut. potassium hydrate and chloroform the disagreeable odor of phenyl isocyanide.

Flueckiger (ACIDS). Free mineral acids decolorize a violet-colored mixture of ferrous sulphate, gallic acid, and sodium acetate

Flueckiger (ARSENIC). Solut. mercuric chloride is employed in place of the silver nitrate used according to Gutzeit (q. v.). With this modification arseniuretted hydrogen produces a yellow spot, darkened by water, but permanent toward alcohol. Very dilute antimony hydride does not affect the mercuricchloride. Somewhat less diluted it produces a brown spot, which disappears upon addition of alcohol if sufficient mercuric chloride was on the test-paper.

Flueckiger (BRUCINE). A crimson color is produced on mixing an aqueous solut. of brucine with mercurous-nitrate solut. free from excess of acid, and heating.

Flueckiger (COLCHICINE). A very dilute and almost colorless solut. colchicine is colored yellow by sulphuric acid, and bluish-violet by nitric acid.

Flueckiger (CREOSOTE; PHENOL). 1.—On mixing 1 volume of ferric-chloride solut. (sp. gr. 1.34) with 9 of creosote and adding 5 of alcohol (85-%), a green color is produced; the solut. becomes cloudy and brownish on adding 60 volumes water. Phenol or a mixture in considerable proportion with creosote gives a brown color with the alcohol, changing to blue on adding water. 2.—Croesote gives a brown or dirty green color on adding one-fourth its bulk ammonia and exposing to vapor of bromine; phenol causes a blue color under similar conditions.

Flueckiger (CURARINE). A dark-blue color is produced on precipitating curarine with potassium bichromate and adding sulphuric acid to the dried precipitate.

Flueckiger (DIGITALIN). An alcoholic solut. chloral dissolves digitalin with a yellowish-green color which, on heating, changes first to violet, then to blackish-green.

Flueckiger (ESSENTIAL OILS). The reaction lasts longer, and its violence is diminished on applying the sulphuric acid test, if the oils be previously diluted with 6 to 10 volumes of carbon disulphide.

Flueckiger (EUPHORBIUM). On extracting euphorbium with ether, evaporating, and adding sulphuric acid, a yellowish-brown color is produced, which changes to violet on adding nitric acid.

Flueckiger (GALLIC ACID). On adding to gallic acid a freshly

prepared aqueous solut. ferrous sulphate (1:100), and adding sodium acetate, the mixture turns violet.

Flueckiger (GURJUN OIL). On dissolving 15 drops copaiba containing gurjun oil in twenty times its bulk carbon disulphide, and adding 1 drop of cooled mixture of equal volumes sulphuric and nitric acids, a violet color will develop.

Flueckiger (DIFFERENTIATING NAPHTOLS). If 0.2 Gm. naphtol is shaken with 0.2 Gm. mercuric chloride, 0.1 Gm. nitric acid and 10 Cc. water at 100° C., alpha-naphtol is indicated by a slight scarlet-red precipitate; beta-naphtol by a voluminous reddish-brown ppt.

Flueckiger (PEPPERMINT OIL). 1.—A bluish-green color develops on adding fused salicylic acid to peppermint oil; the addition of alcohol gives a solut. which is blue by transmitted light, red by reflected light. 2.—The addition of 1 drop nitric acid (sp. gr. 1.20) to 50 drops peppermint oil causes fluorescence after several hours. 3.—The reddish color produced on adding chloral hydrate to peppermint oil is intensified by H_2SO_4, and changed to dark violet on adding chloroform.

Flueckiger (PHENOL IN CLOVE OIL). Shake the oil with fifty times its volume of hot water, cool, decant the oil and concentrate the aqueous liquid by evaporation. On adding to the residue a drop of ammonia solution and sprinkling on the surface a little chlorinated lime, a green to blue color develops if phenol present.

Flueckiger (QUININE). 1.—Bromine water and an excess of ammonia added to a solution of quinine give an emerald-green color. (Thalleioquin reaction.) See *Brand's* test. 2.—Chlorine water, potassium ferricyanide and ammonia produce a red color with quinine. 3.—A ray of light passing through an acid solution of quinine has a bluish color.

Flueckiger (TEST PAPER). Sublimate Paper. Paper impregnated with $HgCl_2$ gives with arseniuretted hydrogen a yellow, then a brown, color.

Flueckiger (VALERIAN OIL). A blue color is produced on dissolving 1 drop valerian oil in 15 drops carbon disulphide, and adding 1 drop sulphuric acid, followed by 1 drop nitric acid (sp. gr. 1.20).

Flueckiger-Behren (SESAME OIL). Five drops sesame oil when treated with 5 drops of a cooled mixture of equal parts conc. sulphuric acid, nitric acid and water, produce a green zone. Upon immediate addition of 5 drops carbon disulphide an upper greenish layer is produced, which fades more slowly than the original color.

Foa (FIXING LIQUID). Equal parts saturated solut. mercuric chloride in normal-salt solut. (0.75-%) and Muller's solution or 5-% bichromate solut.

Foa (HEMATOXYLIN AND SAFRANINE STAIN). Distilled water, 100 parts; Boehmer's hematoxylin solution, 25 parts; 1-% solut. safranine in water and alcohol, 20 parts.

Focke (GLUCOSE). See *Trommer's* test.

Foettinger (NARCOTIZATION METHOD). Drop crystals of chloral hydrate into the water (0.25 to 0.80 Gm. to each 100 Cc.) containing the organisms.

Fokker (URIC ACID). In urine containing uric acid, and previously made alkaline with soda, solut. of ammonium chloride causes formation of the difficultly soluble ammonium urate. This test serves also, particularly in Salkowsky's modification, for quantitative estimation.

Fol (ALBUMIN FIXATIVE). Filter whipped white of egg through a Bunsen filter, then add an equal bulk of glycerin and a little camphor or carbolic acid.

Fol (BERLIN-BLUE GELATIN MASS). *a.*—120 Cc. cold saturated solution of ferrous sulphate and 300 Cc. warm gelatin solution; *b.*—600 Cc. gelatin solution, 240 Cc. of a saturated solut. oxalic acid, and 240 Cc. cold saturated solution of potassium ferricyanide. Pour *a* into *b* gradually with vigorous shaking, and warm the whole for 15 minutes on a boiling water-bath. Then allow mass to set, press out into strings through tulle or fine netting, wash strings, and spread out to dry on parafined parchment paper. When required for use, soak in cold water for a few minutes, and then warm with enough oxalic acid to enable it to completely dissolve.

Fol (CARMINE-GELATIN MASS). Macerate sheet gelatin for 2 days in concentrated ammoniacal carmine solution (strong solut. ammonia, 1 part; water, 3 or 4 parts; carmine, to saturation. Filter.); then rinse and put for a few hours into

water acidulated with acetic acid. Wash well on a sieve with running water for several hours to remove excess of acid or ammonia, melt, and pour on to large sheets of parchment paper soaked with paraffin, which are hung up to dry in an airy place. When dry separate gelatin, cut into long strips, and protect from dust and damp. When required for use soak for a few minutes in water and melt on a water-bath.

Fol (DECALCIFICATION LIQUID). Mix 70 volumes of 1-% chromic acid solut., 3 of nitric acid, and 200 of water.

Fol (FERRIC-CHLORIDE FIXING AND STAINING PROCESS). Preparations are treated with tincture of ferric chloride diluted with 5 to 10 times its bulk of 70-% alcohol, and then transferred for 25 hours to alcohol containing a trace of gallic acid.

Fol (FIXING SOLUTION). Mix osmic acid (1-% solut.), 4 Cc.; solut. chromic acid (10-%), 5 Cc.; glacial acetic acid, 10 Cc.; distilled water, 181 Cc.

Fol (GELATIN FIXATIVE). Dissolve 4 Gm. gelatin in 20 Cc. glacial acid on a water-bath, and to each 5 Cc. of solut. add 70 Cc. of 70-% alcohol, and 1 to 2 Cc. of 5-% aqueous chrome-alum solut.

Fol (GLYCERIN JELLIES). 1.—Melt together one volume Beale's glycerin jelly and half to one volume of water, then add 2- to 5-% salicylic-acid solution, or carbolic acid or camphor. 2.—Gelatin, 30 parts; water, 70 parts; glycerin, 100 parts; alcoholic solut. camphor, 5 parts. 3.—Gelatin, 20 parts; water, 150 parts; glycerin, 100 parts; alcoholic solut. camphor, 15 parts.

Fol (METAGELATIN VEHICLE). Metagelatin is prepared by adding a slight proportion of ammonia to a solut. of gelatin, and heating the solution for several hours. Coloring matters are then added as required, and the vehicles thinned if necessary by the addition of weak alcohol. After injection preparations are thrown into strong alcohol or chromic-acid solution to set the mass.

Fol (NARCOTIZATION METHOD). Saturate the water containing the organisms with carbon dioxide gas.

Fol (PICRO-CHROMIC ACID METHOD). Mix saturated aqueous solut. picric acid, 10 vols., with 1-% chromic acid solut., 25

vols., and water 65 vols. At the moment of using add 0.005 vol. of osmic-acid solution, wash preparations with nearly boiling water, and then with alcohol.

Fol (SLIDE-CLEANING SOLUTION). Dissolve potassium bichromate 3 parts, and sulphuric acid, 3 parts, in water 40 parts.

Fonzes-Diacon (DIFFERENTIATING CREOSOTE AND GUAIACOL). 1.—Mix 10 Cc. of solut. (10 drops to liter) with 2 Cc. 1:200 copper-sulphate solut., then add 1 Cc. 1:250 solut. potassium cyanide—orange-yellow to greenish-orange develops, according to quantity of guaiacol present. Color may be compared with that given by a solut. of known strength. 2.—Dissolve trace of liquid in a little water, place on sheet of glass, add 2 to 3 Cc. 4-% solut. copper sulphate, then add 2 Cc. 1:250 solut. potassium cyanide—striæ form, emerald green with creosote; reddish gray with poor guaiacol; and purplish maroon with good guaiacol.

Fordos (LEAD). Tin containing lead is stained yellow on applying a drop of nitric acid, heating, then cooling and applying a drop 5-% potassium-iodide solut.

Formanek (ALKALOIDS AND GLUCOSIDES). Add a little nitric acid to a small quantity of substance in a porcelain capsule, and evaporate slowly on water-bath, treat cooled residue with ammonia, then with caustic potassa. Various alkaloids and glucosides give different color-reactions and residues. For details of reactions with aloin, amygdalin, brucine, cotoin, paracotoin, emodin, narcotine, salicin, and strychnine, see MERCK'S REPORT, IV, p. 221.

Formanek (INDICATOR). Alizarin Green B. Gives with alkalies a green; with acids a carmine-red.

Forney (ALCOHOL IN ESSENTIAL OILS). See *McClellan-Forney*.

Fourcroy (PHOSPHORIC ACID). A white crystalline ppt. is thrown down on adding to phosphoric acid ammonium chloride and ammonia, followed by magnesium sulphate.

Fraenkel (FIXING MIXTURE). Mix 15 parts 1-% palladium-chloride solut. with 5 parts of 2-% osmic-acid solut. and a few drops acetic acid.

Fraenkel (TUBERCLE STAIN). Boil aniline water in a test-tube, pour into watch-glass, add as many drops conc. alcoholic solut. fuchsine as will produce a shimmering color to surface. Then

float cover-glass preparations on liquid for 5 to 10 minutes, then place in methylene-blue sulphuric-acid solut. for 1 to 2 minutes. Rinse in water or in 0.5-% acetic acid water.

Fraenkel-Voge (CULTURE SOLUTION FOR BACTERIA). Sodium chloride, 5; neutral sodium phosphate, 2; ammonium lactate, 6; asparagin, 4; dissolved in distilled water, 1,000.

Fraenzel (SUBLIMATE SOLUTION). Add 1 drop nitric acid to each Cc. 5-% aqueous sublimate solut.

Fraenzel-Balmer (TUBERCLE BACILLI STAIN). See *Balmer-Fraentzel.*

Francis (BILIARY ACIDS IN URINE). Dissolve 2 Gm. glucose (dried on water-bath) in 15 Gm. sulphuric acid, and overlay 4 Cc. of this reagent with 4 Cc. urine—a purple color develops if biliary acids present.

François (THEOBROMINE). 1.—0.1 Gm. dissolved in 1 Cc. nitric acid and 2 Cc. water becomes cloudy on adding 10 Cc. 10-% solut. silver nitrate, clears on warming, and crystallizes on again cooling. 2.—Bromine water added to solut. of substance in hydrochloric acid, and bromine excess driven off—solut. turns blue on adding trace of ferrous sulphate in solut. and few drops ammonia. 3.—Dark-green needles of theobromine tetraiodide form on adding iodine solut. to solut. of alkaloid in hydrochloric acid, collecting the ppt., dissolving it in 10-% solut. potassium iodide, and crystallizing.

Frankenstein (ANIMAL AND VEGETABLE FIBERS). When moistened with olive oil and then dried between filter-paper, animal fibers and cotton remain unaltered, whilst flax becomes transparent.

Frankland (NITROUS ACID). A faintly acid solut. of sulphanilic acid, and phenol. Reagent is mixed with the fluid to be tested, then ammonia is added—if nitrous acid present, a red color appears. See *Riegler's* test.

Franqui-Van de Vyvere (GLUCOSE). Reduction occurs on heating urine containing glucose with a solution of bismuth hydroxide in potassium hydroxide.

Fraude (ALKALOIDS). Boil a trace of alkaloid with several Cc. of an aqueous solut. perchloric acid, sp. gr. 1.13 to 1.14—*aspidospermine* is colored fuchsine-red; *brucine* madeiro-red; *strychnine* reddish-yellow.

Frebault (INDICATOR). Potassium- or sodium picramate (dinitramido-phenate) is changed from bright red to greenish-yellow by acids.

Frederking (ALCOHOL IN ETHER). On shaking a mixture of ether and alcohol with an equal bulk of glycerin the volume of the latter will be increased.

Freeborn (PICRO-NIGROSIN METHOD). Mix 5 Cc. of 1-% aqueous solut. nigrosin with 45 Cc. aqueous picric-acid solut. Stain for 3 to 5 minutes, wash with water, and mount in balsam.

Frerich (LEUCIN AND TYROSIN IN URINE). Ppt. urine with basic lead acetate; remove excess of latter with hydrogen sulphide, and evap. liquid to small volume on water-bath—crystals of tyrosin form in 24 hours; leucin appears later.

Fresenius (NITRITES). Add starch-paste, solut. potassium iodide, and sulphuric acid to liquid—a blue color develops if nitrites present.

Fresenius (NITROUS ACID IN WATER). The water to be examined is acidulated with acetic acid and distilled. The distillate is collected in potassium-iodide starch solution acidulated with sulphuric acid, whereby nitrous acid is indicated by the development of a blue color.

Fresenius (PHENOL). If phenol is boiled with a solut. mercurous nitrate containing traces of free acid, metallic mercury is precipitated, and the odor of salicylic aldehyde becomes apparent. See *Plugge's* phenol test.

Fresenius-Babo (ARSENIC). Arsenates and arsenic sulphide are reduced on fusing with 12 parts of a mixture of sodium carbonate, 3, and potassium cyanide, 1, in a stream of carbonic acid, the substance being heated in a porcelain boat placed in a reduction tube. The arsenic may be identified by the formation of a mirror.

Fresenius-Neubauer (PHOSPHORUS). Vapors of phosphorus reduce silver-nitrate solut.

Freund (SULPHATES IN URINE). To 60 Cc. urine add 10 drops each 1-% solut. alizarin and 5-% acetic acid. When mixture is orange, triturate with solut. barium acetate (11.22:1000) till ppt. distinctly red (1 Cc. of barium-acetate solut. = 3 Mg.

sulphur trioxide). If urine dark, decolorize with acetic acid and powd. zinc.

Frey (AMMONIA CARMINE). Carmine, 0.15 to 0.30 Gm.; ammonia, a sufficiency; water, 30 Gm.; filter and add glycerin, 30 Gm., and strong alcohol, 8 to 12 Gm.

Frey (ARTIFICIAL IODIZED SERUM). Distilled water, 135 Gm.; egg albumin, 15 Gm.; sodium chloride, 0.20 Gm. After filtration add tincture iodine, 3 Gm. Any precipitate is removed by filtering through flannel, and a little iodine is then added to the filtrate.

Frey (FUCHSINE SOLUTION). For staining microscopic preparations, there is used a solut. of 0.01 Gm. crystallized fuchsine, 20 to 25 drops absolute alcohol, and 15 Cc. of water.

Friedenwald-Ehrlich (DIAZO REACTION FOR TYPHOID AND TUBERCULE). This is a modification of Ehrlich's reaction, in which the sulphanilic acid is replaced by *p*-amido-acetophenone. With this reagent the diazo reaction is obtained in *Bacillus typhus abdominalis* and *B. tuberculosis miliaris*.

Friedlander (ACETIC GENTIAN-VIOLET). Conc. alcoholic solut. gentian violet, 50 Gm.; acetic acid, 10 Gm.; distilled water, 100 Gm.

Friedlander (CAPSULE STAIN). Stain for 24 hours in Friedlander's acetic-acid gentian-violet solut., then decolorize in 0.1-% acetic-acid solut., and rinse in water.

Friedlander (FIXING MIXTURE). Dissolve copper and zinc sulphates, 125 parts each, in 1,000 parts of water.

Friedlander (STAINING METHODS). Cover-glass preparations are treated for 3 minutes with a 1-% solut. acetic acid, and allowed to dry after removal of excess of liquid by filter-paper. Next place in gentian-violet aniline water (aniline water, 100 Cc.; concentrated alcoholic solut. gentian violet, 11 Cc.; absolute alcohol, 10 Cc.) for half a minute, wash in water, dry and mount in balsam. Sections are kept for 24 hours in a warm place, in the following solution: Conc. alcoholic solut. gentian violet, 50 Cc.; distilled water, 100 Cc.; glacial acetic acid, 10 Cc. Then treat for 1 or 2 minutes with 0.1-% acetic acid, dehydrate, clear and mount in balsam.

Friedlander (WOOD FIBER IN PAPER). Fuming hydrobromic acid colors wood fiber an intense green.

Frisch (CREOSOTE; PHENOL). An alcoholic solut. creosote is colored emerald green by an alcoholic solut. ferric chloride; phenol is colored blue.

Fritsche (HYDROCARBONS). Dinitroanthraquinone yields crystalline compounds with many hydrocarbons.

Froehde (ALBUMIN). Solut. of molybdic acid in sulphuric acid gives a dark-blue color with albumin in substance.

Froehde (ALKALOIDS). With alkaloids and glucosides a freshly prepared solution of 0.01 Gm. of sodium molybdate in 1 Cc. of concentrated sulphuric acid (according to others 0.01 Gm. : 10 Cc., also 1 Gm. : 10 Cc.) produces characteristic color-reactions. For details see Hager, Pharm. Praxis, 1886, I, 208. Proteins yield a dark-blue color.

Froehde (HYDROCYANIC ACID). If a cyanide is fused with sodium thiosulphate, the mass dissolved in water and ferric chloride added, a blood-red color ensues.

Frohn (ALBUMINOUS SUBSTANCES AND ALKALOIDS). Boil 1.5 Gm. freshly precipitated bismuth subnitrate with a solut. of 7 Gm. potassium iodide in 20 Cc. water, and then add 20 drops hydrochloric acid. The orange-yellow solution produces precipitates in acid solutions of albumin and alkaloids. See also *Dragendorff's* test.

Frommerherz (GLUCOSE). 41.76 Gm. of crystallized copper sulphate, 20.88 Gm. of potassium bitartrate, and 10.44 Gm. of potassa, dissolved in sufficient water to make a liter. See *Fehling's* test.

Fuerbringer (ALBUMIN). Mixture of mercic and sodium chlorides with citric acid and sodium chloride. In albuminous urine the reagent causes a turbidity or a flocculent ppt. As, however, uric acid is also precipitated, the urine must first be diluted. See also *Stuetz's* albumin capsules.

Fuerbringer (MERCURY). Urine is acidified and "brass-wool" immersed in it, then rinsed with water, absolute alcohol, and ether in turn. On heating the brass to redness in a combustion tube containing a little iodine at one end, mercury (if present) vaporizes and combines with the iodine to form red iodide.

Fuge (REDUCED IRON). Dissolve 4 Gm. pure copper sulphate in 100 Cc. hot water, and add 1 Gm. of sample. Shake in a

corked flask for 10 minutes, then filter, and titrate with decinormal potassium-bichromate solution.

Gabbet (DYE FOR TUBERCLE BACILLI). This consists of 2 Gm. methylene blue, 25 Gm. conc. sulphuric acid, and 75 Gm. water.

Gabbet-Ernst (TUBERCLE STAIN). Stain cover-glass preparation in cold Ziehl-Neelsen's carbol-fuchsine solut. for 2 to 5 min., then for 1 min. in Gabbet's methylene-blue sulphuric-acid solut. (see above), and rinse in water. This method is one of the most rapid, convenient, and exact.

Gaffky (STAINING METHODS). Leave sections hardened in alcohol for 20 to 24 hours in a deep-blue opaque solution, freshly made by adding saturated alcoholic solut. of methylene blue to distilled water. Then wash in distilled water, dehydrate in absolute alcohol, clear in turpentine oil, and mount in balsam.

Gage (CLEARING MIXTURE). Mix 40 Cc. melted carbolic acid with 60 Cc. turpentine oil.

Gage (DECALCIFICATION FLUID). Dilute a sat. aqueous solut. alum with an equal vol. of water, and to each 100 Cc. of the solution add 5 Cc. of strong nitric acid. Change every 2 or 3 days until decalcification complete.

Gage (FORMALDEHYDE MIXTURE). Add two parts of 40-% formaldehyde solution to 1,000 parts normal salt-solution (0.75-% in water).

Gage (PICRIC ALCOHOL). Mix 250 parts of 95-% alcohol with 750 parts water and 1 part picric acid.

Gage (PRESERVATIVE FLUID). Egg albumin, 15 Cc.; water, 200 Cc.; mercuric chloride, 0.5 Gm.; sodium chloride, 4 Gm. Filter and preserve in a cool place.

Gage (PRESERVATIVE FOR POTASH AND SODA PREPARATIONS). Mount tissues treated with strong potassa or soda solution, in 60-% potassium-acetate solut. (with or without the addition of 1% acetic acid), or simply treat and mount in glycerin or glycerin jelly. They may be stained if the acetate be first washed out by treatment with alum solution for 24 hours.

Gaglio (MERCURY VAPORS IN ATMOSPHERE). Pass air to be tested through a solut. palladium chloride in 500 parts of water. The palladium chloride is previously dissolved in

hydrochloric acid with aid of nitric acid and repeatedly evaporated to dryness with hydrochloric acid. If mercury present the solution is reduced, as shown by the formation of black spots.

Galippe (ALBUMIN). Picric acid solution is added drop by drop to the suspected urine. A white cloudiness indicates the presence of albumin. Compare *Hager's* alkaloid reagent.

Gallois (INOSITE IN URINE). Free urine from glucose by fermentation and from albumin by boiling, evaporate to a small bulk, and add a drop mercurous-nitrate solut. If inosite present the residue upon complete evaporation is yellow, and, upon warming, becomes red. (By this treatment albumin is colored rose-red, sugar, black; hence these must previously be completely removed.)

Ganassini (HYDROGEN SULPHIDE). The reagent is a solution of 1.25 Gm. ammonium molybdate in 50 Cc. distilled water, which is mixed with a separately prepared solut. of 2.5 Gm. of potassium sulphocynate in 45 Cc. water to which 5 Cc. conc. HCl are added. Strips of filter-paper are impregnated with the solut. so obtained, and dried. The strips so prepared when brought into contact with H_2S develop an intense, violet color. Should a red color develop in the solut. because of the presence of iron, it may be dissipated by adding a very small quantity of oxalic acid until the color becomes a yellowish-green. The solut. is then to be used as above stated. The reagent is stated to be advantageous because of its sensitiveness, and because of the readiness with which it may be everywhere prepared.

Gannal (MOUNTING MEDIUM). Dissolve 1 part of aluminium acetate in 10 parts water.

Ganswindt (ROSE OIL). Impurities in rose oil may be detected by noting odor given off on atomizing a mixture of one drop oil and 1½ fl. oz. water in a moderately warm room.

Ganther (BLOOD STAINS). Place 1 drop of solut. of blood stain, or small portion of rust containing blood, on glass slide (on black paper), add 1 drop feebly alkaline water, and in a few minutes 1 drop hydrogen dioxide—if trace of blood present, comparatively large bubbles of oxygen form, and unite to a froth persisting several hours, and collecting gradually

towards the center. Pus behaves similarly. Test may be used to identify hemin crystals.

Gantter (COTTONSEED OIL IN LARD). Dissolve 1 Gm. melted fat in 10 Cc. petroleum ether, add 1 drop conc. sulphuric acid, and shake mixture—if cottonseed oil present, a dark-brown color develops; pure lard remains colorless or a light brown.

Gardiner (TANNIC ACID). Ammonium-molybdate solution produces a yellow precipitate with the acid.

Garrigou (ORGANIC MATTER IN MINERAL WATERS). Barium hydrate added to a mineral water ppts. all metallic oxides present and allows organic matters to be detected. For details see MERCK'S REPORT, X, p. 87.

Garrod (URIC ACID IN BLOOD). Add 0.5 Cc. acetic acid to 30 Cc. blood serum, and immerse a fine thread—if uric acid present, crystals form on thread (obtained specially in gout but also in leucemia and chlorosis).

Gassend (SESAME OIL). To 15 Cc. of the oil and 10 Cc. of oxalic-acid solution, add 2 to 3 Cc. of 10-% sodium-bisulphite solut., shake, and set aside for 5 minutes—if the red color permanent, the oil may be assumed to be adulterated with sesame oil. (Modified *Baudouin's* test).

Gatehouse (ARSENIC). A black stain is produced on silver-nitrate paper held over mouth of test-tube in which an arsenical solution is heated with caustic soda and a strip of aluminium.

Gaudail (ALBUMIN). Mercuric nitrate gives a ppt. with albumin.

Gaule (FIXING LIQUID). Mercuric chloride, 5 Gm.; sodium chloride, 0.5 Gm.; water, 100 Cc.

Gaultier de Claubry-Chatin (IODINE). See *Chatin-Gaultier de Claubry.*

Gautier (ALBUMIN). 250 Cc. soda solution, 50 Cc. 3-% copper-sulphate solution, and 700 Cc. of glacial acetic acid. This mixture precipitates serum albumin from its solutions, but not egg albumin.

Gautier (TANNIN REACTION). Precipitation effected by shaking with cuprous carbonate and adding alcohol, or by addition of aqueous copper-acetate (1:30).

Gawalowski (ALBUMIN IN URINE). Improved *Esbach's* reagent. Picric acid, 1; citric acid, 2; water, 50; alcohol, 30; dissolve, and add water to 100.

Gawalowski (ALCOHOL IN PERU BALSAM). Odor of aldehyde is given off on adding Peru balsam containing alcohol to a solut. of potassium bichromate in sulphuric acid.

Gawalowski (BENZIN: BENZENE). Picric acid is soluble in the benzene, giving an intense yellow color; insoluble in benzin.

Gawalowski (INDICATOR). Methyl-orange and phenolphtalein solution, used as a neutrality indicator. Gives with alkalies a red color; neutral solutions give a lemon-yellow; and acids give a pink color.

Gayard (MANGANESE IN ZINC). On treating with dil. sulphuric acid and electrolyzing clear solution, a violet color appears around platinum electrode.

Gayard (TANNIN; GALLIC ACID). To distinguish tannin from gallic acid, add a conc. solution lead acetate—the tannate formed is insoluble; the gallate is said to be soluble.

Gayon-Ganon-Molher (ALDEHYDES). Test solution is prepared by mixing 100 Cc. sodium-bisulphite solut. sp. gr. 1.3, with 150 Cc. 1:1,000 aqueous fuchsine solution, diluting with 1 liter water, and finally adding 15 Cc. conc. sulphuric acid.

Gehe (PERU BALSAM). Shake 5 Gm. Peru balsam with 5 Gm. sodium-hydroxide solut. (sp. gr. 1.168 to 1.172), then wash out with three successive 10 Gm. of ether. Evaporate solvent in tared dish until two weighings at 5 minutes' interval show difference of not more than 1 Cgm. To weighed residue add 35 to 40 Cc. of semi-normal alcoholic potassa solution and 20 Cc. alcohol, saponify on water-bath, and titrate with acid. Weight of residue (cinnamein) should be from 57 to 60%; and the acid number between 235 and 238.

Geissler (ALBUMIN). A white ppt. is given by urine containing albumin on adding solut. potassium iodide, 3.32 Gm., and mercuric chloride, 1.35 Gm., in water, 40 Cc., and acetic acid, 20 Cc.

Geissler (ALBUMIN TEST-PAPERS). Strips of filter-paper, some saturated with conc. citric-acid solution, some with 3-% corrosive-sublimate solut. to which 12 to 15% potassium iodide has been added. A strip of the acid paper is dipped into the urine, then the mercury-potassium-iodide paper—if

albumin present a ppt. forms. Concentrated urine must first be diluted. See *Oliver's* test.

Geissler (FUCHSINE IN WINE). 1.—Amyl alcohol shaken with wine, after adding excess of ammonia, takes up fuchsine only. 2.—Melted stearin is poured into wine heated to 60° C., and the mixture shaken briskly. On slowly cooling the stearin will be colored red if fuchsine present.

Geitel (NEUTRAL FAT IN FREE FATTY ACIDS). Dissolve 2 Gm. of the fatty acids in 15 Cc. hot alcohol and add 15 Cc. ammonia—if considerable neutral fat present, solution becomes turbid. Traces of neutral fat detected by overlaying solution with cold methyl alcohol—if neutral fat present a turbidity occurs at contact-point.

Geith (STEARIN IN WAX). Wax containing stearin causes lime-water to lose its alkalinity on boiling.

Genfer (STAIN FOR MICRO SECTIONS). A 1-% ammonio-congo-red solut., to which is added 0.1% of chrysoidine. The section is first bleached with Javelle water, then well washed and made alkaline with ammonia, before immersion in stain. In vegetable preparations, the cuticle is stained golden-yellow; wood fibers orange-red to straw-yellow; phloem rose-red. Preparations should be mounted in glycerin-gelatin; the colors are permanent.

Gentele (SUGAR DETERMINATION). Potassium ferricyande, 27.45 Gm.; solution caustic soda, sp. gr. 1.34, 25 Cc., water to make 250 Cc.

Geoffroy (MOUNTING MEDIUM). Dissolve with as little heat as possible, 3 to 4 Gm. gelatin in 100 Cc. of 10-% aqueous chloral-hydrate solut. See *Gilson's* chloral-hydrate jelly.

Geogehan (ACID TEST). All inorganic and organic acids, excepting hydrocyanic acid, precipitate red mercuric iodide from a solution of a double salt of mercury cyanide and potassium iodide.

Gerard (BILIARY PIGMENTS). Dilute aqueous iodopotassium-iodide solut. is added in small quantity to chloroformic extract of urine, and potassa solut. added—reddish color of the chloroformic extract disappears, and, if biliary pigments present, potassa solut. is colored green.

Gerber (FIXED OILS IN COPAIBA). Pure copaiba remains clear on shaking with ammonia; fixed oils, if present, cause cloudiness.

Gerhardt (ACETONE IN URINE). Treat 10 to 15 Cc. urine with ferric-chloride solut. until a ppt. is formed. Filter, and again add ferric chloride to filtrate. If acetone present a Bordeaux-red color develops.

Gerhardt (BILIARY PIGMENTS). 1.—A green color forms on extracting urine with chloroform, decanting, and mixing with ozonized turpentine oil and a little dilute potassa solut. 2.—A yellow to brownish-yellow color, with greenish fluorescence, forms on adding iodine and sufficient dilute potassa solut. to chloroformic extract.

Gerhardt (BRUCINE). A violet color develops on dissolving brucine in nitric acid, heating solut. till it becomes yellow, then adding water and a solut. stannous chloride.

Gerrard (ATROPINE AND HYOSCYAMINE). Solut. 5 Gm. mercuric chloride in 95 Gm. 50-% alcohol. If 2 Cc. of reagent are warmed with 0.001 Gm. atropine, a red ppt. forms. Hyocyamine produces a similar ppt. Homatropine is not pptd.

Gerrard (GLUCOSE). Dilute 10 Cc. Fehling's reagent with 40 Cc. of water and heat to boiling; a solut. of potassium cyanide of about 5-% strength is then run in until the blue color is only just visible. Another 10 Cc. of Fehling's solution are now added, and the urine or other saccharine solution run in rapidly from a burette, the liquid being kept boiling; when the color is discharged the volume of liquid added is read off; this volume contains 0.05 Gm. of glucose; in cases where more than 0.5% of glucose is present, the urine must be diluted with water.

Giacomi (STAINING METHOD). Stain cover-glass preparations for a few minutes in hot solut. fuchsine, then place in water containing a few drops ferric-chloride solut., and afterwards decolorize in strong ferric-chloride solution. If any ppt. be formed with the iron solution, complete decolorization in alcohol. Counter-stain with vesuvine.

Giacomi (SYPHILIS-BACILLUS STAIN). Stain several minutes in aniline-water fuchsine, then place in water containing

several drops Fe_2Cl_6 solut., and finally rinse in water. Syphilis bacilli lose their color in mineral acids at once, or very quickly—35 to 45 seconds (differentiation from tubercle and leprosy bacilli)—but they bear immersion in alcohol for a considerably longer time without effect (differentiation from smegma bacillus).

Gibbes (BORAX CARMINE). Carmine, 30 grains; borax, 120 grains; water, 4 fl. oz. Decant when clear. After staining sections in this for a few minutes, wash in mixture of hydrochloric acid, 1 part, and absolute alcohol, 20 parts. When tissues are bright rose-red wash in several changes of alcohol to remove acid.

Gibbes (DOUBLE STAINING METHOD). Magenta, 2 Gm.; methylene blue, 1 Gm.; add slowly aniline, 3 Cc., dissolved in alcohol, 15 Cc. Subsequently add 15 Cc. distilled water and keep stain in a stoppered bottle. Place cover-glass preparations for 4 minutes in the slightly heated stain and leave sections for some hours in the stain at ordinary temperature. Afterwards wash in methylated spirit until no more color comes away, then dehydrate, clear in cedar oil, and mount in balsam.

Gibbes (MAGENTA STAIN). Magenta, 2 Gm.; aniline, 3 Gm.; rectified spirit, 20 Cc.; distilled water, 20 Cc.

Gibbs (STAIN FOR TUBERCLE BACILLI). Fuchsine, 2, and methylene blue, 1, are well rubbed together with a mixture of aniline, 3 vol.; alcohol (95-%), 15 vol.; water, 15 vol. Preparations stained with this solut. show tubercle bacilli red, on a blue ground.

Giesbrecht (SHELLAC FIXATIVE). Filter a moderately strong solut. of brown shellac in absolute alcohol and spread on warmed slides by means of a glass rod dipped in the solut. and drawn once over each slide. Then let the slides dry. Brush them over with creosote shortly before applying sections, and after the latter have been arranged, heat on a water-bath for about 15 minutes at the melting-point of the paraffin. On cooling, the sections will be found to be firmly fixed in the shellac, and the paraffin may be dissolved away by dropping turpentine on them.

Giesecke (FREE SULPHURIC ACID IN ALUMINIUM SULPHATE). Tincture of hematoxylon causes in dilute solut. of acid-free salt a deep, violet color; if free acid present, color will be pale, brownish-yellow.

Giesel (COCAINE). 5 Cc. 1-% cocaine solut. yield upon addition of 2 Cc. sat. potassium-permanganate solut. a violet ppt. of cocaine permanganate.

Gieson, Van- (FORMALIN METHOD). Tissues are hardened in 4-, 6-, or 10-% solutions of formaldehyde, followed by 95-% alcohol.

Gigli (PHENACETIN). Mix equal volumes saturated solut. phenacetin and chlorine water, and add few drops ammonia—a reddish to brown color develops If phenacetin contains 5 to 10% quinine, a handsome blue develops on adding chlorine water.

Gil (FREE SULPHUR). Heat alcohol containing a small quantity of caustic potassa or caustic soda with substance to be examined—if sulphur present, the alcohol will acquire a blue or green color, according to quantity of sulphur present.

Gilbert (MAGNESIA MIXTURE). Magnesium chloride, 10.15 Gm.; ammonium chloride, 20 Gm.; 10-% ammonia, 40 Cc.; water, to make 100 Cc.; 10 Cc. of this solut. ppt. 0.355 Gm. phosphoric acid.

Gilbert (PHOSPHORIC ACID). Magnesia mixture is used as a reagent.

Gilson (BLEACHING PROCESS). Objects hardened in bichromate solution are bleached with a few drops alcoholic solut. of sulphurous anhydride.

Gilson (CHLORAL-HYDRATE JELLY). Mix equal volumes melted gelatin and glycerin, and add crystals of chloral hydrate until the bulk of the mixture has increased by one half, warming until dissolved. See *Geoffroy's* mounting medium.

Gilson (HARDENING MIXTURE). Mix 1 part chloroform with 1 or 2 parts oil cedar, and add from time to time more oil cedar, until all the chloroform is replaced.

Gilson (IMBEDDING PROCESS). Dehydrate objects, soak in ether, and place in test-tube containing collodion or thin celloidin solution. Dip the tube into a bath of melted paraffin

and allow collodion to boil until it becomes syrupy, and is reduced to about one-third its original volume. Then turn out the mass, mount on a block of hardened celloidin, and harden in chloroform for about an hour. Next clear in cedar oil and fix on the microtome.

Gilson (MERCURO-NITRIC MIXTURE). Nitric acid (sp. gr. 1.456), 78 Cc.; glacial acetic acid, 22 Cc.; mercuric chloride, 95 to 100 Gm.; alcohol (60-%), 500 Cc.; distilled water, 4400 Cc. When required for marine animals, add a few crystals iodine. Any granular precipitate in the preparations should be removed by washing with water containing a little tincture of iodine.

Gilson (PRESERVATIVE FLUID). Alcohol (60-%), 60 Cc.; water, 30 Cc.; glycerin, 30 Cc.; acetic acid (15 parts glacial acid, 85 water), 2 Cc.; mercuric chloride, 0.15 Gm.

Girard (COAL-TAR DYES IN WINE). To 20 Cc. wine add 4 Cc. 10-% potassa solut. and 20 Cc. 5-% mercurous-sulphate solut., shake and filter—natural wine yields a colorless filtrate; artificially colored wine a red.

Girardin (SULPHUROUS ACID). Hydrochloric acid containing sulphurous acid gives a yellowish-brown ppt. on adding to 16 Gm. of the acid 10 Gm. crystallized stannous chloride and 2 to 3 Cc. water.

Glaessner (DIFFERENTIATING FATTY OILS). Test depends upon their behavior toward fuming nitric acid, concentrated sulphuric acid, and carbon disulphide. For details consult Benedikt; "*Analyse der Fette*," II, p. 309.

Glage (PRESERVATIVE SOLUTION FOR ANATOMICAL SPECIMENS). Modified *Keiserling's* method. Potass. nitrate, 10 Gm.; potass. acetate, 30 Gm.; formaldehyde, 750 Gm.; dist. water, 1,000 Gm. In this soak for one or two days sections 1.5 centimeters thick, then transfer them to 80-% alcohol, in which they resume their natural color. They may then be preserved in a mixture of water, glycerin and potassium acetate.

Glenard (QUININE). On adding a drop of ammonium-sulphate, phosphate, or oxalate solution, quinine separates in needle-shaped crystals, as seen under the microscope. Cinchonine is amorphous.

Gmelin (BILIARY MATTER). Pour cautiously down the side of a conical glass vessel containing 6 to 8 volumes of urine 2 volumes of a mixture of equal parts of 25-% nitric acid and red fuming nitric acid, so that the acid may collect at the bottom of the vessel. If biliary pigments present zone color reactions are produced, changing from green to blue, violet, red, and yellow. To increase intensity of reaction, a ppt. of barium sulphate is produced in the urine which carries with it the coloring matter. The collected and dried ppt. is then tested with nitric acid.

Brueck's modification: Addition first of diluted, boiled nitric acid, then concentrated sulphuric acid.

Dragendorff's, or *Deubner's* modification: Filter through a porous plate instead of filter-paper and then test residue on the plate with nitric acid.

Heintz's modification: Bring urine and fuming nitric acid in contact on porcelain plate, or overlay in test-tube—play of colors takes place, passing from green to blue and finally violet.

Hilger's modification: The urine is treated with barium hydrate at a moderate temperature and the resultant ppt. after washing is tested with nitric acid.

Vitali's modification: A few drops of potassium-nitrite solution are added, then diluted sulphuric acid.

Masset's modification: Conc. sulphuric acid is first added to urine, then a crystal of potassium nitrite—green streaks radiate from the fragments of the nitrite.

Fleischl's modification: The urine is mixed with an equal volume of conc. sodium-nitrite solution, then a layer of conc. sulphuric acid is added from below by means of a pipette.

Rosenbach's modification: Nitroso-nitric acid is added to residue left on filtering the urine.

Gmelin-Smithson (MERCURY). Envelop one end of a thick polished iron wire with gold leaf, and immerse it in the fluid to more than cover the gold part. If mercury present, the gold soon becomes white. The wire bearing the gold is then dried over sulphuric acid, cut off, and heated to redness in a glass tube drawn out to a point, in a current of hydrogen, when the mercury condenses in the cool part of the tube.

Goadby (PRESERVATIVE FLUID). 120 Gm. sodium chloride, 60 Gm. of alum, 0.25 Gm. mercuric chloride, and 2.33 liters water. A stronger preparation contains only half the quantity mercuric chloride and water. When preparations contain calcium carbonate, omit the alum.

Godbay (SOLUTION). See *Goadby's* preservative fluid.

Godefiroy (ALKALOIDS). 1.—Solution antimony chloride precipitates from hydrochloric-acid solutions, aconitine, atropine, quinine, cinchonine, piperin, strychnine, and veratine, as white or yellow ppts. Caffeine and morphine are not pptd. 2.—In addition to antimony chloride and silico-tungstic acid, Godeffroy recommended, as reagents for alkaloids, solutions of ferric chloride or stannous chloride in hydrochloric acid. For cinchona alkaloids he applied the micro-sulpho-cyanide test. See *Proceedings Am. Pharm. Assoc.*, 1877-78.

Godeffroy-Laubenheimer (ALKALOIDS). Silico-tungstic acid produces very difficultly soluble precipitates with solutions of hydrochlorates of alkaloids.

Goette (HARDENING FLUID). 50 Cc. of 2-% copper-sulphate solution; 50 Cc. 25-% alcohol; and 35 drops rectified wood vinegar.

Golding-Bird (ALDEHYDE). Spirit nitrous ether containing aldehyde is colored yellow on adding dilute potassa solut.

Goldmann (HEROIN). Boil small quantity of substance with dil. sulphuric acid, add some alcohol, and boil again—odor of acetic ether developed if heroin present.

Goldmann (SALOPHEN). Boil substance with 2½% soda lye—a blue color, due to atmospheric oxidation, develops.

Goldmann-Baumann (CYSTINE). See *Baumann-Goldmann.*

Golgi (SUBLIMATE METHOD). Harden small cubes of tissue for 15 to 30 days in Müller's fluid, which should be frequently changed. Then transfer for 8 to 10 days to 0.25- to 1-% aqueous mercuric-chloride solut., which must be changed, as it becomes colored. If desired, treat subsequently with weak sodium-sulphide solution to darken stain and make it sharper. After cutting sections from material thus prepared they must be well washed with water.

Gorup-Besanez (CREOSOTE). An emerald-green color develops on adding alcoholic ferric-chloride solut. to creosote; carbolic acid gives a blue.

Gorup-Besanez (PEPTONE). This is the biuret reaction, a pale rose-red being produced on adding a little potassa- or soda solution, together with a few drops of very dilute solut. (almost colorless) of copper sulphate. Albumin gives a blue color; albuminates, a violet.

Gottstein (BACTERIA IN POTABLE WATER). Bacteria causes evolution of oxygen when hydrogen dioxide is added to water containing them. With 10,000 in 1 Cc. disengagement is very brisk; with 1,000 in 1 Cc. evolution still distinct. Reaction does not sometimes take place until 15 minutes after adding the dioxide.

Gouver (ALBUMIN). A solut. of mercuric cyanide in excess of potassium iodide gives with albuminoids a white ppt.

Graham-Hoffmann (ALKALOIDS). Take up alkaloids with animal charcoal, then extract with suitable solvents.

Grahe (CINCHONA BARKS). Genuine cinchona barks when heated in a test-tube yield red fumes; spurious barks yield vapors and a brownish tar.

Gram (BACTERIA STAIN). 1.—Shake 15 drops aniline oil with 15 Gm. water, filter the solut. and add to filtrate 4 to 5 drops of sat. alcoholic solut. gentian violet. 2.—Shake 3.3 Cc. aniline with 100 Cc. distilled water, filter, add 11 Cc. conc. alcoholic solut. gentian violet and 10 Cc. absolute alcohol. After preparations have been stained for 1 to 3 minutes in one of the above they are quickly rinsed in absolute alcohol and then placed in Gram's solut. of iodine in potassium iodide (iodine, 1 Gm.; potassium iodide, 2 Gm.; water, 300 Cc.), until they have acquired a brown color. This takes about 1 to 3 minutes, and they are next washed in 90-% alcohol until pale yellow, then dehydrated, cleared, and mounted in balsam. Counterstain with eosine or vesuvine if desired. Certain bacteria (anthrax) retain the color, whereas others (cholera, typhus, Bact. coli), as well as cellular nuclei, are decolorized.

Gram (IODINE SOLUTION). Iodine, 1 Gm.; potassium iodide, 2 Gm.; distilled water, 300 Gm.

Gram-Gunther (MICRO-SECTION STAIN). A modification of Gram's process, in which the section, after treatment with iodine, is put into absolute alcohol for half a minute, then in 3-% hydrochloric acid-alcohol for ten seconds, and again for a few minutes in absolute alcohol, this treatment being continued till no more decoloration takes place. Finally the sections are placed in xylene, then in Canada balsam.

Grandeau (ALKALOIDS). To the solution of alkaloids in conc. sulphuric acid, bromine water is carefully added. With some alkaloids it produces characteristic color reactions. The solution of digitalin and digitalein in sulphuric acid is yellow, but changes to rose-red and violet by the action of bromine. Preparations of digitalis yield the same reaction. Morphine also produces a red color.

Grange (IODINE). A violet or blue color is developed with hyponitrous acid, chloroform, and starch paste.

Grant-Cohen (ALKALIES WITH THE SULPHITES). Place in a flask a measured volume of hydrogen dioxide colored with methyl orange, and made exactly neutral with sufficient caustic soda, then add solut. containing a known quantity of salt to be analyzed, and boil. Sulphites are oxidized to sulphates; when cool, more methyl orange is added, and the liquid titrated with normal acid.

Graser (STAINING METHOD). Stain sections for 12 to 24 hours in an extremely dilute aqueous solut. methyl violet, then wash out in acidulated alcohol, and subsequently in pure alcohol.

Grassini (COBALT). On adding solut. potass. sulphocyanate to a dil. solut. cobalt chloride and overlaying with alcohol the latter acquires a turquoise blue on rotating. H_2O_2 completely destroys the color.

Gravis (AGAR AGAR). Agar agar, 1 part; water, 1,000 parts. Used for fixing serial sections on slides. Use like *Born-Wieger's* quince mucilage, which see.

Gray (GELATIN PROCESS). Fix serial sections on slides with a solut. of gelatin, 1 part, in water, 100 parts. Let slides dry spontaneously overnight, then remove paraffin with a suitable solvent, and treat preparations for 5 minutes with a 2-% solut. potassium bichromate to render the gelatin insoluble. Stain as desired, and mount.

Greenwalt (TEST-PAPER). Iris Paper. Paper impregnated with a hot aqueous extract of Blue flag, and dried. The paper, when neutral, has a blue color, changed to green by alkalies, and to red by acids.

Grehant (CRUCIFEROUS OILS). The fixed oils of the Cruciferæ yield a black color on boiling with potassa lye and adding silver-nitrate solut.

Greittherr (COCAINE REACTION). A few drops cocaine solution mixed with 2 to 3 Cc. chlorine water and a few drops 0.5-% palladium-chloride solut. yield a handsome red ppt., insoluble in alcohol, and in ether, but soluble in sodium-thiosulphate solution.

Grenacher (ALCOHOLIC CARMINE). Add 3 to 4 drops hydrochloric acid, and a few grains powdered carmine to 50 Cc. 60- to 80-% alcohol. Boil for 10 minutes, cool, and filter.

Grenacher (ALUM CARMINE). Dissolve 5 Gm. ammonia alum in 100 Cc. distilled water; add 1 Gm. carmine, and boil for 20 minutes; filter when cool, and add distilled water to make up to 100 Cc.

Grenacher (BLEACHING MIXTURE). Glycerin, 1 part; 80-% alcohol, 2 parts; add 2 to 3% hydrochloric acid.

Grenacher (BORAX CARMINE). *Aqueous:* Borax. 1 to 2; carmine, 0.5 to 0.75. Boil with water, 100 fl. parts, then add acetic acid carefully to purple solut. till color deep-red. Filter after 124 hrs. *Alcoholic:* Carmine, 2 to 3; borax, 4. Dissolve in boiling water, 100 fl. parts, then dilute with equal vol. of 70-% alcohol, and filter after standing some time. Pieces of tissue are stained in this for 1 to 3 days, then transferred to 70-% alcohol containing 0.5 to 1% HCl.

Grenacher (HEMATOXYLIN STAIN). Mix 4 Cc. saturated solut. hematoxylin crystals in absolute alcohol and 150 Cc. saturated aqueous solut. ammonium alum. After solution has stood in the light a week it is filtered, and glycerin, 22 Cc., and methyl alcohol, 25 Cc., added. See also *Delafield's* hematoxylin.

Grenacher (HYDROCHLORIC-ACID CARMINE). As much carmine as will lie on the point of a knife is dissolved in 50 Cc. 60- to 80-% alcohol, to which are added 3 to 4 drops hydrochloric acid. Then filter.

Grenacher (STAINING SOLUTION FOR CELL NUCLEUS). Carmine, 0.5 to 1; potassium or ammonium alum, 1 to 5; water, 100 fl. parts. After filtering, add a trace of carbolic acid.

Greshoff (IODOFORM). Iodoform reacts actively with silver nitrate, yielding carbon monoxide, silver iodide, and nitric acid.

Griess (FECAL MATTER IN WATER). A 1-% solut. of diazosulphanilic acid made alkaline with soda solution. Water containing fecal matter becomes yellow within five minutes on addition of this solution.

Griess (NITROUS ACID). 1.—A solution of a salt of metaphenylenediamine produces a yellowish-brown color with nitrous acid. A 0.5-% solut. of the base is prepared with the aid of sufficient sulphuric acid to acid reaction. If the solut. is not colorless it should be decolorized with freshly-burnt animal charcoal. 2.—A solut. of sulphanilic acid and naphtylamine sulphate is colored red by traces of nitrous acid. The solution to be tested is acidified with sulphuric acid; sulphanilic acid solution is added, and, after a few minutes, solution of naphtylamine sulphate, which has been decolorized with animal charcoal. See *Lunge's* reaction.

Griess (TEST-PAPER FOR NITRATES AND NITRITES). 1.—Paper impregnated with an alcoh. solut. sulphanilic acid and alpha-naphtylamine sulphate (or hydrochlorate). Gives with nitrous acid and nitrites a red color. Also used to detect bilirubin and aldehydes in urine. 2.—Metaphenylenediamine paper. Gives a yellowish-brown color with nitrites.

Griess-Ilosvay (NITROUS ACID). Dissolve sulphanilic acid, 0.5 Gm., in acetic acid, 150 Cc., then add naphtylamine, 0.1 Gm., boiled with water, 20 Cc. The colorless solution is poured off from the blue-violet residue, and acetic acid, 150 Cc., added to it. The solutions are then mixed and, if necessary, rendered colorless by shaking with zinc dust. The reagent should be kept in well-closed vessels.

Griessmayer (FREE ALKALIES). The colorless mixture obtained on adding 1 Cc. centinormal iodine solution to one drop of tannin solution becomes a brilliant red on adding a faintly alkaline solution.

Griessmayer (TANNIN). 1.—The author's test for free alkalies is reversed, the same red color being developed. 2.—Starch solution colored blue with a very dilute iodine solution (1:100,000) is decolorized on adding tannin solut.; potassium nitrate restores the color.

Grigg (ALBUMIN). Metaphosphoric acid precipitates albumin. See *Berzelius'* albumin reagent.

Griggi (ACIDS [MINERAL] IN VINEGAR). Add 1 drop of 25-% fuchsine solut. (in 90-% alcohol) to 1 Cc. vinegar—if pure, no change of color; if mineral acids present (even 1%), color becomes a dirty-yellow.

Griggi (BENZOIC ACID IN BENZONAPHTOL). Exhaust substance with alcohol, and treat extract with potassium iodide and potassium iodate—iodine separates if free benzoic acid present, and is shown by yellow color of liquid, or by reddish-violet color of carbon disulphide on admixture of latter. Avoid an excess of potassium iodide.

Griggi (DIFFERENTIATING GALLIC ACID FROM TANNIN AND PYROGALLOL). Shake a few Cc. of 1-% solut. of substance with 1 Cc. of 3.3-% solut. potassium cyanide—bright ruby-red color develops with gallic acid. Tannin or pyrogallol similarly treated gives a yellowish-red. With excess of reagent gallic acid gives permanent yellowish-brown ppt.; tannin a characteristic dirty-white ppt.

Griggi (DIFFERENTIATING IRON CITRATE AND POTASSIO-FERRIC TARTRATE). Dissolve a few scales in 5 Cc. water, with warmth if necessary, and add 5 Cc. 5-% solut. sod. salicylate —with iron citrate, solut. is at once dark-red; potassio-ferric tartrate remains uncolored, or darkens only after a while.

Griggi (IRON IN COPPER SULPHATE). Overlay 5 Cc. of 1:5 copper-sulphate solut. with 5 Cc. ethereal 10-% solut. salicylic acid—more or less violet zone forms if iron present.

Grimaux (NITRATES). An aqueous solut. of nitroquinetol, acidulated with sulphuric acid, gives with nitric acid or nitrates an immediate ppt. of nitroquinetol nitrate.

Grimshaw (ACETIC ACID IN CALCIUM ACETATE). Treat 10 Gm. acetate with water, add excess of sodium bisulphate, filter, make up to definite volume, and titrate a known volume with standard alkali. Evaporate an equal volume to

dryness with repeated moistening with water to drive off free acetic acid, dissolve residue, and titrate with alkali—difference between two titrations gives quantity of acetic acid.

Grismer (GLUCOSE IN URINE). *a.*—Solut. safranine 1:1,000. *b.*—Solut. potassium hydrate. Boil 1 Cc. urine with 5 Cc. *a* and 2 Cc. *b*—decolorization denotes glucose.

Grocco (CREATININE IN URINE). Modified *Neubauer's* method. Urine acidified with acetic acid is kept for 24 hours then treated with milk-of-lime until only faintly acid; calcium chloride is then added, and the liquid evaporated, keeping it faintly acid by cautious addition of acetic acid. The residue is then extracted with alcohol containing a little sodium acetate, and the filtered liquid pptd. with alcoholic zinc chloride.

Grodyki (ACETAL). Iodoform is formed on adding to a dilute solution a few drops hydrochloric acid, followed by soda solution and iodine.

Grove (MORPHINE). A dark-brown color is produced by morphine on adding a few drops sulphuric acid, heating moderately, and adding a trace of potassium perchlorate entirely free from chlorate.

Gruber-Widal (REACTION). See *Widal* reaction.

Gruenhut (GLYCERIN). Mix substance with double its weight potassium bisulphate, heat on sand-bath until frothing commences, and collect distillate in cooled receiver. Condensate will smell strongly of acroleine, and will reduce alkaline silver solution in the cold.

Guareschi (CARBOLIC ACID). A purplish-red color develops on evaporating to dryness with potassa and mixing warm residue with chloroform.

Guenzburg (FREE HYDROCHLORIC ACID IN GASTRIC JUICE). Dissolve 2 Gm. phloroglucin and 1 Gm. vanillin in 30 Gm. alcohol. If a few drops of solution be evaporated with an equal bulk gastric juice in a porcelain capsule, the presence of hydrochloric acid is indicated by the formation of a red film.

Guenzburg (TEST-PAPER FOR HYDROCHLORIC ACID). Paper impregnated with an alcoholic solution of phloroglucin-vanillin (2:1) gives a red color with HCl.

Guerin (ALBUMIN IN URINE). Add a 10-% solut. chromic acid to 5 or 6 Cc. urine—a ppt. or turbidity not dissipated by heat indicates albumin. Peptones and protopeptones (hemialbumose; albuminose) and some alkaloids also give ppts., but these disappear on heating.

Guerin (ALBUMINOIDS IN URINE). Add 10 to 15 drops of 10-% solut. sozoiodolic acid to 8 or 10 Cc. of urine—a flocculent ppt. or cloudiness forms, according to quantity of albumin present. Alkaline urates and uric acid not pptd. by reagent. Albumoses, peptones, and most alkaloids pptd. by the acid, but ppts. disappear on heating. Nucleo-albumins cause only faint cloudiness in cold, and an insol. ppt. on heating.

Guezda (ALBUMINS). Solution of nickel sulphate and ammonia gives a ppt. with albumins.

Guezda (INDOL BASES AND ALBUMINOIDS). Fuse trace of indol with 0.5 Gm. oxalic acid—a purple-red melted mass or sublimate, scarcely changed by KOH, is obtained. Alpha-methylindol, skatol, and methylindolcarbonic acid also give the purplish-red color; alphaphenylindol affords a greenish-yellow sublimate, changing to black. Oxalic acid fused with albumin, peptone, and gelatin affords a pink sublimate. Other animal substances behave differently, some giving a greenish, some only very little characteristic color reactions. Alloxanthin, however, gives with oxalic acid a red color.

Guibourt (ROSE OIL). 1.—Impure oil is colored brown when exposed under a bell-jar with iodine. 2.—An apple-green color with nitrous-acid vapors indicates rose-geranium oil. 3.—Sulphuric acid does not destroy odor of pure rose oil.

Guignet (REAGENT). Ammoniacal solution of copper sulphate.

Guldensteeden (COPPER IN WATER). Acidulate 250 Cc. water with acetic acid, pass hydrogen sulphide into solut., and add 0.5 Gm. talcum (purified by boiling with nitric acid). Shake, let settle, and decant. Collect ppt. and wash it with a few Cc. warm nitric acid. Evaporate washings to dryness, and dissolve residue in few drops water. Place a drop of this solut. on a polished iron surface with a trace HCl. To another portion add a drop potassium-chromate solut. with acetic acid, then add 1 or 2 drops ammonia and a trace of phenol—a blue color develops in a few hours.

Gulielmo (ATROPINE). On heating with conc. sulphuric acid an odor of orange flowers (some say rose) develops.

Gulli (OIL TURPENTINE IN BERGAMOT OIL). Mix several grammes suspected oil with alcoholic potassa solut., and evaporate to dryness in a platinum dish. Ignite residue, treat with dist. water, filter, and test solut. for HCl (which will be present if the bergamot oil contains any oil turpentine saturated with HCl, and which is used as an adulterant).

Gunn (COCA ASSAY). Dampen 5 Gm. powd. coca with 2-% ammonia, let stand 30 minutes, then percolate with ammoniated ether to obtain 100 Cc. percolate (or until exhausted). Shake out percolate with 3 washings of 2-% HCl, then wash acid extract once with ether, make alkaline with ammonia, wash out thrice with ether, collect ethereal washings in a tared dish, evaporate solvent, and dry residue at 75° C.

Gunning (ACETONE). Iodoform and a black precipitate of nitrogen iodide are formed on adding tincture of iodine and ammonia to the solution to be tested (*e. g.*, distillate from urine). The nitrogen iodide gradually disappears, and the yellow color of the iodoform predominates. Alcohol in this case does not produce iodoform. Compare *L ebeu's* reaction.

Gunther (BACTERIA STAIN). Modified Gram's method. Stain in aniline-water gentian-violet 1 minute, dry with filter-paper, treat with KI solut. 2 minutes, then with alcohol 30 seconds, 3-% HCl 10 seconds, then with alcohol and with cedar oil, and finally mount in Canada balsam.

Gutzeit (ARSENIC). The substance to be tested, together with pure zinc and pure dilute sulphuric acid, is placed in a test-tube, the mouth of which is closed with a piece of filter-paper moistened with a few drops of 50-% silver-nitrate solut. The arseniuretted hydrogen formed if arsenic present produces a yellow spot on the paper, which is blackened upon moistening with water. See *Flueckiger's* test for arsenic.

Guyard (MANGANESE IN ZINC). See *Gayard.*

Guyard (TANNIN: GALLIC ACID). See *Gayard.*

Guyon (ALDEHYDES). Dissolve 1 Gm. fuchsine in 1 liter water and add a mixture of 20 Cc. sodium-bisulphite solut. (30° Bé.) and 10 Cc. concentrated hydrochloric acid. 1 Cc. of reagent added to 2 Cc. of solution to be tested will show the

presence of aldehyde by formation of an intensely purple-red color. Reagent also known as *Schiff's* reagent.

Guyot (AMMONIA). Potassium bromide is added to an acid solution of mercuric nitrate until the precipitate first formed is redissolved; then caustic-potassa solution is added until an orange-yellow precipitate forms, which is then filtered off. The solution gives a white precipitate with ammonia. Compare with *Nessler's* reagent.

Guyot (IODOFORM). A blue color develops on heating iodoform in a flask and passing the vapor through a heated tube containing starch.

Hack-Kingzett (REAGENT). Conc. sulphuric acid and sugar (*Pettenkofer's* bile test) affords color reactions with benzene, camphor, clove oil and other ethereal oils, morphine, phenol, piperin, pyrogallol, salicylic acid, turpentine oil, etc.; *e. g.*, on dissolving camphor in conc. sulphuric acid and adding cane sugar to the deep-red fluid, the solution solidifies and forms a pink mass; on adding water to this the color disappears, and a ppt. insoluble in ether forms.

Haensel (SOLUTION). A trace of acetic acid is added to Fol's picro-chromic acid solut.

Haentsch (GLYCERIN MEDIUM). Glycerin, 1 part; alcohol, 3 parts; water, 2 parts.

Hagen (STRYCHNINE). On adding sulphuric acid and lead dioxide to the suspected liquid, a bluish-violet color develops.

Hager (ALBUMIN IN URINE). A solution of picric acid produces turbidity in urine containing albumin.

Hager (ALCOHOL IN ESSENTIAL OILS). 1.—On shaking an essential oil containing alcohol with an equal volume of a mixture of water, 1, glycerin, 2 (or a solution of sodium nitrate, 1, in water, 3), and allowing to stand a while, the volume of oil will be diminished in proportion to the amount of alcohol present. 2.—If a trace of tannin be added to 5 drops of essential oil containing alcohol and, after shaking, the mixture is left for several hours at the ordinary temperature, the tannin will sink after becoming pasty and adhesive; in the absence of alcohol, the tannin will continue to float, remaining solid and porous. 3.—If a drop of oil be poured into water, a turbidity indicates presence of alcohol.

Hager (ALCOHOL IN ETHER). Add a small fragment of fuchsine to the ether—the latter, if pure, remains uncolored.

Hager (ALKALOIDS). Solut. of picric acid produces precipitates in alkaloidal solutions. Solut. also used for albumin by overlaying urine—in presence of albumin a turbidity is produced.

Hager (AMMONIA). Solution of mercurous nitrate gives a brown color or a black ppt. with ammonia.

Hager (AMYLIC ALCOHOL). On dipping a roll of filter-paper into alcohol containing fusel oil, and mixed with 10% of glycerin, the odor of amylic alcohol becomes very pronounced when paper is dried at a temperature not exceeding 25° C..

Hager (ARSENIC). 1.—Arseniuretted hydrogen is evolved on heating a liquid containing arsenic with excess of potassa solution, zinc, and a little magnesium ribbon. 2.—An arsenica solution will develop a steel-colored to brown stain when heated to about 90° C. on thick tin-foil, after acidifying strongly with hydrochloric acid. 3.—When a substance or liquid containing arsenic is boiled with sodium chloride, ferrous chloride, and dilute sulphuric acid, arsenic chloride and hydrochloric acid are formed, and the arsenic may be tested in any convenient way after passing the products of the reaction into water. 4.—In the "Kramato" method, a bluish to black stain or violet ring is formed on letting a drop of a hydrochloric-acid solution of arsenic fall upon a strip of bright brass, copper, tin, or tin-foil, and heating moderately. See *Reinsch's* test. 5.—The substance or liquid is placed in a test-tube with some diluted sulphuric acid and a small piece of zinc; the tube is then closed with a cork in which are two slits, into one of which a strip of lead-acetate paper is inserted, and into the other a strip of silver-nitrate paper. The lead paper will indicate sulphurous acid and the silver paper arsenic, the stains produced by the latter being unaffected by a 10-% solution of potassium cyanide.

Hager (BENZOIN IN BALSAM PERU). Dissolve 1 part balsam in 7 parts 70-% alcohol, and compare with sample of known quality (the more benzoin the lighter the color). Then dilute half with 4 or 5 volumes water and shake. The resulting fluid should retain its original turbidity for 3 days on standing at ordinary temperature; if the balsam contains resin, oil, or

tar, the liquid will not be so turbid, and will show a ppt. either floating or at the bottom.

Hager (BRUCINE). A yellowish to blocd-red color develops on adding dilute sulphuric acid and manganese dioxide to a solution of brucine and filtering. The color is changed to violet on heating the filtrate with nitric acid in the presence of stannous chloride.

Hager (BUTTER [ORGANOLEPTIC REACTION]). A cotton wick is saturated with the liquefied fat and ignited, the flame being extinguished after two minutes — pure butter develops the odor of strongly-fried butter; margarin that of acrolein.

Hager (CACAO BUTTER [ANILINE TEST]). 1 Gm. cacao butter is dissolved in 2 to 3 Gm. aniline, and set aside for 1½ hours at a temperature of 15° C. Pure cacao butter floats as a clear liquid layer on the aniline; if tallow, wax, stearin, or paraffin is present, the oily layer shows granular formations or has solidified entirely.

Hager (CASTOR OIL IN COPAIVA BALSAM). Mix balsam with 4 volumes petroleum benzin—on standing a few hours separation takes place, as castor oil is not completely soluble in the petroleum benzin.

Hager (CHLOROFORM IN ESSENTIAL OILS). Shake 15 drops of suspected oil with 50 to 60 drops alcohol, and 30 drops diluted sulphuric acid; then add a few pieces of zinc, and heat. When evolution of hydrogen ceases, add an equal volume of cold water, shake and run through a wet filter. If chloroform present in the oil, silver chloride will be pptd. on acidifying filtrate strongly with nitric acid, and adding silver-nitrate solution.

Hager (CHOLESTERIN). See *Salkowski's* test.

Hager (CITRIC AND TARTARIC ACIDS). Pour a solut. of potassium hydroxide, 1, in water, 2, and alcohol, 1, upon a glass plate, and place crystals of the acid at intervals of 1 to 2 inches. Citric acid dissolves almost entirely without losing its transparency within 1 or 2 hours; tartaric acid soon becomes an opaque white.

Hager (COLCHICINE). In concentrated solutions of colchicine, a solution of borax produces a white ppt.; in dilute solutions

the ppt. is not formed at ordinary temperatures, but upon heating to 50° C.

Hager (COPPER IN VINEGAR). Add 15 drops solut. of potassium ferrocyanide to 15 Cc. vinegar—on standing a few hours a brown ppt. deposits if copper present in traces; if much copper present, ppt. develops at once.

Hager (DEXTRIN IN ACACIA). A blue color develops on boiling a liquid containing dextrin with ammonium molybdate and a little nitric or citric acid.

Hager (ESSENTIAL OILS). 1.—Oils are distinguished by their varying solubility in alcohol, as indicated by the opalescence produced (See *Proc. Am. Pharm. Assoc.*, 1882). 2.—Shake 5 or 6 drops of the oil with 25 to 30 drops sulphuric acid, and note the heat and turbidity produced; on cooling, add 8 or 10 Cc. of 90-% alcohol, shake briskly, and note the color and turbidity. See Prescott's "*Organic Analysis.*"

Hager (FATTY OILS IN COPAIVA BALSAM). Heat 5 to 10 drops of balsam in a watch-glass for 15 to 20 minutes at 110° to 120° C., and then cool—if balsam good, the residue is hard and brittle; if fatty oils present, it is pasty or sticky.

Hager (FIXED OILS). In the "elaidin" test the oil is shaken with an equal volume of 25-% nitric acid, a strip of copper added, and the mixture set aside at the ordinary temperature; note the appearance of the mixture at intervals of 15 minutes. See Prescott's "*Organic Analysis.*"

Hager (FREE ACID IN ALUMINIUM SULPHATE). Shake the powdered salt with absolute alcohol—the filtrate must not have an acid reaction.

Hager (GALLIC AND TANNIC ACIDS). Add excess of sodium-phosphate solut. to liquid and add ferric chloride—carbolic or salicylic acid causes no color, but gallic or tannic acid causes a violet color.

Hager (GLUCOSE). Solution of 30 Gm. of red mercuric oxide, 30 Gm. of sodium acetate, 50 Gm. of sodium chloride, 25 Gm. of glacial acetic acid, and 400 Cc. of water, diluted to a liter. Solution containing glucose (diabetic urine) and boiled with reagent, yields a ppt. of mercurous chloride.

Hager (GLYCERIN). An aqueous solut. glycerin colored blue by litmus tincture, when mixed with a solution of borax, also

colored blue by means of litmus, assumes a red color. See *Lindo's* test for glycerin.

Hager (GURJUN BALSAM IN BALSAM COPAIVA). Mix 1 volume balsam copaiva with 5 volumes petroleum ether—if gurjun balsam present, mixture becomes very turbid in a few minutes, and a voluminous precipitate deposits, becoming solid in a few days. With pure copaiva, a dust-like deposit forms after several hours.

Hager (HYDRIDES OF SULPHUR, ARSENIC, ANTIMONY, AND PHOSPHORUS). The hydrides formed by action of zinc and sulphuric acid in presence of the substance tested are allowed to act on parchment paper moistened with silver-nitrate solut. If resulting brown or black spot is macerated with 10-% potassium cyanide solution the color resulting from action of sulphuretted hydrogen disappears at once; that resulting from the hydrides of antimony and phosphorus disappears gradually (1 to 2 hrs.); that from the arseniuretted hydrogen not at all.

Hager (HYDROCYANIC ACID IN AMYL NITRITE). Add 2 or 3 drops solut. silver nitrate to mixture of 10 drops amyl nitrite and 100 to 150 drops alcohol—cloudiness or ppt. indicates presence of hydrocyanic acid.

Hager (IODIC ACID IN NITRIC ACID). On adding to 3 Cc. of the suspected nitric acid, 3 drops sodium-sulphite solut. and after 1 minute, 5 Cc. of ammonia water with 1 drop silver-nitrate solut., a cloudiness or ppt. appears in the presence of iodic acid, and does not disappear on the addition of several Cc. ammonia water.

Hager (MINERAL ACIDS). Vinegar containing free mineral acid leaves a crystalline residue on adding one-fourth its bulk ammonia and evaporating above 70° C.

Hager (NITRIC ACID). A blue color is caused by molybdic acid and sugar.

Hager (NITROBENZENE IN ESSENTIAL OIL ALMOND). Pure oil forms a clear solut. on gently agitating 10 drops with 10 Cc. 45-% alcohol; in the presence of nitrobenzene, solut. will be cloudy.

Hager (NITROUS ACID). Carbolic acid with nitrous acid causes a red color, which changes to brown, then green.

Hager (PHOSPHORUS). A black stain is caused on taking up phosphorus with ether or benzene, heating to 30° to 40° C., and exposing a strip of silver-nitrate paper to vapors given off.

Hager (QUININE). On well shaking 2 Gm. pure quinine sulphate with 20 Cc. cold water and filtering, then diluting filtrate with equal bulk of water and shaking with 10 or 12 drops sodium-salicylate solut. (1:5), the solut. remains clear; other cinchona alkaloids, if present, cause cloudiness.

Hager (SANTONIN). On well shaking 2 Gm. pure santonin with 6 Cc. water and filtering, then adding 1 or 2 Cc. sat. picric-acid solut., no cloudiness or ppt. should occur.

Hager (SODIUM SALTS). White cloudiness is caused by sodium salts on adding a mixture of crystallized stannous chloride, 5, water, 10, and sufficient potassium-hydroxide solut. Test may also be employed to detect lithium and ammonium salts.

Hager (STRYCHNINE). Sulphuric acid and lead peroxide give a bluish-violet color with strychnine.

Hager (SUGAR IN GLYCERIN). A blue color develops on boiling 5 drops glycerin containing sugar with 100 drops water, 3 or 4 Cgm. ammonium molybdate, and 1 drop of 25-% nitric acid.

Hager (TURPENTINE IN COPAIVA). 1.—Odor of turpentine becomes very apparent when 1 dram copaiva containing it is mixed with 5 or 6 drops water and sufficient litharge to make a thin paste. 2.—Pure copaiva forms a clear mixture with 12 volumes of 90-% alcohol, and the mixture becomes turbid on adding 12 volumes more; in presence of turpentine or other adulterant the result is different.

Hager (POTABLE WATER). Addition of tannin solution (tannin, 1, water, 4, and alcohol, 1) to potable water should cause no turbidity, even after standing some time.

Hager (WAX). 1.—Dissolve 0.5 Gm. wax in 5 Cc. chloroform—a residue indicates presence of honey, prepared chalk, ocher, alumina, starch, sulphur, brick dust, lead oxide, lead carbonate, gypsum, or water. 2.—Boil wax with 15 parts of a mixture of water, 1, and 90-% alcohol, 2, and cool; if cloudy, filter and mix with equal volume water. If resin present, it is dissolved by the alcoholic liquid; stearin, paraffin, and wax remain unaffected. 3.—Shake 2 Cc. chloroformic solut. of wax with 12 to 15 Cc. lime water—stearic acid forms a granu-

lar lime soap, whereas the chloroform and wax form an emulsion-like separate layer. 4.—On heating wax in a test-tube, odors of acrolein develop if tallow present in the wax.

Hager-Landolt (PARAFFIN IN WAX). Melt 2 Gm. wax in a wide test-tube, add 1.5 Gm. KOH dissolved in 4 Cc. water, and boil 1½ minutes with constant agitation; when somewhat cool, add 8 Gm. benzene and shake vigorously, then add to the still milky fluid 5.5 Cc. conc. solut. lead acetate and shake. Decant the clear, separated benzene through cotton, and repeat shaking with fresh benzene. Evaporate benzene extracts, add to residue 6 Gm. conc. H_2SO_4, and heat on sand-bath till wax all carbonized, then let cool, add water, and collect undecomposed paraffin. Purify this by extracting with petroleum ether and evaporating solvent.

Hahnemann (LEAD AND COPPER IN URINE). A black or brown ppt. is thrown down on shaking with a solut. made by dissolving tartaric acid, 1, in water, 64, shaking briskly for a while with calcium sulphide, 1, and decanting.

Haine (GLUCOSE). 3 Gm. copper sulphate, 9 Gm. potassa, 100 Gm. glycerin, and 600 Gm. water. Glucose (diabetic urine), upon the application of heat, precipitates red cuprous oxide from solut.

Haines (GLUCOSE). The author states that the formulas previously published are incorrect. The following are the proper proportions: Copper sulphate, 2 Gm.; glycerin, 20 Gm.; potassa, 9 Gm.; water, 175 Gm. Boil 4 Cc. of the solut. and add 6 to 10 drops (not more) urine, and boil again—if sugar present a yellow or yellowish-red ppt. forms.

Hairs (SACCHARIN IN PRESENCE OF SALICYLIC ACID). Extract suspected liquid with ether, evaporate, take up ethereal residue with hydrochloric acid, and precipitate salicylic acid by bromine water; remove excess of bromine from filtrate by current of air, and isolate saccharin with ether; then identify saccharin by Bornstein's test.

Haller-Bela (MACERATING MIXTURE). See *Bela-Haller.*

Halphen (COTTONSEED OIL). Mix equal parts of suspected oil, amylic alcohol. and carbon disulphide containing 1% sulphur, place in a test-tube, and plunge ⅓ or ½ into boiling salt water—

after 10 to 15 minutes a red color develops if cottonseed oil present.

Hamann (CARMINE SOLUTION). Add acetic acid to an ammoniacal solut. of carmine until a ppt. begins to form, and filter the fluid before using. Addition of 1 to 2% chloral hydrate renders solut. more permanent.

Hamilton (HEMATOXYLIN). Hematoxylin, 12 Gm.; ammonia alum, 50 Gm.; glycerin, 65 Cc.; distilled water, 130 Cc. Boil the solut., and while hot add 5 Cc. liquid carbolic acid. Expose mixture to daylight for a month to ripen it.

Hamlin (ALKALOIDS). Color reactions are afforded on treatment with sulphuric acid and potassium chromate, followed by chlorinated lime. See *Proc. Am. Pharm. Assn.*, 1881.

Hammarsten (CAFFEINE IN URINE). Add 10 drops dil. sulphuric acid to 500 Cc. urine, and evaporate to 40 Cc. Mix this with 120 Cc. 97-% alcohol, and let stand 12 hours, filter off alcohol, and evaporate. Shake residue with ½ its volume benzene 3 or 4 times, and add to extract chlorine water and ammonia—a violet color indicates presence of caffeine (theine).

Hammarsten (GLOBULIN IN URINE). Globulin is pptd. by a sat. solut. magnesium sulphate, or by crystals of magnesium sulphate.

Hammarsten (INDICAN IN URINE). Mix urine with equal volume fuming hydrochloric acid, add chlorinated-lime solut. drop by drop, and shake out mixture with chloroform. The latter takes up indigo resulting from the indican, and is colored blue. An excess of chlorinated-lime solut. is to be avoided. Also known as *Jaffe's* test.

Hammarsten (METALBUMIN). Mixture of conc. sulphuric acid and acetic acid gives a violet color with metalbumin

Hammarsten-Robbert (THYMOL). Mix a solut. of thymol with half its volume glacial acetic acid and add equal volume sulphuric acid, then heat—a reddish-violet color develops.

Hanaman (SLIDE-CLEANING SOLUTION). Add 1 volume strong sulphuric acid to 8 volumes potassium-bichromate solut

Hannay (CYANIDES). Titrate solut. made alkaline with ammonia with standard solut. mercuric chloride, containing 13.537 Gm. in 1,000 Cc. 1 Cc. = 0.0027 Gm. HCN. A faint turbidity indicates end of reaction.

Hansen (HEMATEIN SOLUTION). Dissolve 1 Gm. hematoxylin crystals in 10 Gm. absolute alcohol, and add a solut. 20 Gm. potassa-alum in 200 Gm. distilled water. Then pour mixture into a porcelain capsule containing 3 Cc. conc. aqueous solut. potassium permanganate, heat to boiling-point with constant stirring, and after solut. has become dark reddish-violet continue boiling for half a minute to a minute. When cool, solut. is ready for use.

Hanstein (ANILINE STAIN FOR MICROSCOPIC PREPARATIONS). 1.—Equal parts methyl violet and fuchsine. 2.—1 part violet and 2 parts fuchsine. For use, a concentrated alcoholic solution of the mixture is prepared.

Hardy (ALCOHOL). A blue color develops on adding guaiac, hydrocyanic acid, and copper sulphate.

Hardy (ALCOHOL IN CHLOROFORM). Hydrogen is evolved on adding metallic sodium.

Harley (UROHEMATIN). 1.—Dilute urine of 24 hours to 60 fl. oz., or concentrate if volume greater. Add to 2 fl. dr. of urine ½ fl. dr. nitric acid and let stand—a pink, crimson, or purple color denotes excess of urohematin. 2.—Boil 4 fl. oz. urine, and add nitric acid; when cool, heat in 6-fl.-oz. bottle with 1 fl. oz. ether, shake, and set aside for 24 hours—a red color in ethereal solution indicates excess of urohematin.

Harnack (IODINE IN URINE). A blue color develops on shaking with starch paste and carbon disulphide.

Hartig (AMMONIA-CARMINE STAIN). Suspend carmine in distilled water, and dissolve by gradual addition of ammonia water, then filter.

Harting (PRESERVATIVE FLUID). An aqueous solut. of mercuric chloride (1 : 200 to 1 : 500).

Haslam (ALBUMIN IN URINE). A whitish zone forms on mixing urine with a few drops solut. sodium chloride and overlaying with solut. ferric chloride.

Hassall (ACONITINE). A violet color develops on dissolving aconitine in syrupy phosphoric acid and cautiously evaporating.

Hatschett (COPPER). Traces of copper salts give with ferrocyanic acid and its salts a brown precipitate (Hatschett's brown).

Hauchecorne (COTTONSEED OIL IN OLIVE OIL). Heat oil, 6 Gm., with 2 Gm. pure nitric acid, 40° Bé., on a water-bath for

2 minutes—pure oil remains unchanged or becomes lighter, and should solidify within 24 hours to a flesh-colored mass. Adulterated oil assumes an orange-brown red. The nitric acid must be free from nitrous acid.

Haug (DECALCIFICATION SOLUTION). Mix 1 Gm. phloroglucin with 10 Cc. pure nitric acid (sp. gr. 1.4), and warm very slowly and carefully with gentle agitation. Dilute solut. with 100 Cc. distilled water and add 10 Cc. nitric acid. Hydrochloric acid may be used instead of nitric acid, 30% of acid being used, and 0.5% sodium chloride should then be added.

Haugk (THIOSULPHATES). Color of potassium-permanganate solut. is changed to bluish-green by thiosulphates.

Hay (BILIARY ACIDS). Throw a little sulphur in fluid—if biliary acids present, the sulphur sinks.

Hayem (SOLUTION FOR FIXING BLOOD CORPUSCLES). Mercuric chloride, 0.5 Gm.; sodium chloride, 1 Gm.; sodium sulphate, 5 Gm.; distilled water, 200 Cc.

Hayem (SOLUTION FOR HYPODERMOCLYSIS). Sodium chloride, 75 grains; sodium sulphate, 150 grains; sterilized water, 40 fl. oz.

Hefelmann (BOMBAY MACE). Basic lead acetate gives a white ppt. with an alcoholic extract of genuine mace; with Bombay mace it gives a red ppt. According to *Waage*, however, this test is not always trustworthy.

Hefelmann-Mann (FLUORINE IN BEER). Test depends upon precipitation of fluorides as calcium or barium fluoride. Upon treating ppt. containing fluorides with sulphuric acid, hydrofluoric acid is liberated and is recognized by its glass-etching properties.

Hegler (LIGNIN). Sections are placed in alcohol, then treated with a hydro-alcoholic thallium-sulphate solut.—lignin is colored orange-yellow; cellulose and cork remain uncolored.

Hehn (CHLORAL REAGENT FOR VOLATILE OILS AND RESINS). Saturate 100 Cc. alcohol with chlorine, and partly remove the resulting hydrochloric acid by distillation. Then add sulphuric acid and distil the resulting metachloral. Two drops of the latter when brought in contact with 1 drop of certain volatile oils or a fragment of some resins produce characteristic color reactions. See Dragendorff, *Analysis of*

Plants. Oil of myrrh (or residue from the petroleum-ether extract of myrrh) produces a violet-red color with the reagent.

Hehner (ACID NUMBER). Denotes the amount of insoluble fatty acids yielded by 100 Gm. of fat, and serves for the characterization of fats.

Hehner (FORMALDEHYDE). Add 1 drop aqueous phenol solut. to suspected liquid, and overlay mixture on conc. sulphuric acid—if formaldehyde present, a carmine-red zone forms at point of contact of two liquids.

Hehner (FORMALDEHYDE IN MILK). 1.—Add some 94-% sulphuric acid—if formaldehyde present, a blue color develops. 2.—Distil a part of the milk, add some peptone, and then sulphuric acid. According to Leonard, the blue color appears only when a trace of ferric chloride or other oxidizer is present in the sulphuric acid.

Hehner (MINERAL ACIDS IN VINEGAR). Add 25 Cc. decinormal alkali to 50 Cc. vinegar, evaporate to dryness, and ignite at low red heat to convert acetates into carbonate. Cool, add 25 Cc. decinormal acid, heat to expel CO_2, and filter; wash filter, and titrate washings and filtrate with decinormal alkali—each Cc. used equals 0.0049 Gm. H_2SO_4 or 0.00364 Gm. HCl. Pure vinegar leaves an alkaline ash.

Heidenhain (ALBUMIN). On pouring a dilute solution of violet-black into an acid solution of serum albumin or casein, a flocculent ppt. very rapidly forms, if any notable quantity of albumin is present. Even in a dilution of 1:20,000 a handsome, colored flocculent ppt. forms after a short time. For the detection of albumin in urine, the latter is acidulated with 0.4-% acetic acid, while slightly heating, so as to change the albumin to acid albumin. An excess of acetic acid hinders the reaction. With a supposed albumin-content of 1:1,000 to 1:5,000, 3 to 5 Cc. of a 2-% dye solution are added to 15 Cc. urine; in the case of an albumin-content of 1:10,000 to 1:20,000 only 3 Cc. of the aniline solution is employed; with a 1:40,000, 2 Cc.; and with a solution of 1:60,000 solution, 1 Cc. is used. The acid aniline dye combines with the albumin, giving a ppt.

Heidenhain (FIXING SOLUTION). Sodium chloride, 0.5-% solution, is saturated with warm corrosive sublimate solut.

Heidenhain (HEMATOXYLIN METHOD). *a.*—Hematoxylin, 1 Gm.; distilled water, 300 Cc. *b.*—Potassium chromate, 1 Gm.; distilled water, 200 Cc. Small pieces of tissue hardened in alcohol or picric arid are placed in *a* for 12 to 24 hours, and then transferred for a similar length of time to *b*. Wash thoroughly in water, dehydrate in alcohol, and imbed in paraffin.

Heidenhain (IRON HEMATOXYLIN METHOD). Sections are treated for ½ to 3 hours with a 1.5- to 4-% solut. iron alum, then washed with water and stained in a 0.5-% aqueous solut. hematoxylin. Rinse with water, and again treat with the iron solut. for 20 to 60 minutes. The sections are sometimes stained for 24 hours or more in a weak solution (1-%) of Bordeaux R., or aniline blue, before treatment with the iron alum.

Heidenhain (NEUTRAL CARMINE). Prepare solut. according to Beale's formula, but with omission of alcohol, and render it almost neutral, either by cautiously adding dilute acetic acid or by driving off the free ammonia by warming on a water-bath.

Heidenhain (SUBLIMATE SOLUTION). A 0.5-% solut. of sodium chloride is saturated while hot with mercuric chloride.

Heidenreich (FIXED OILS). Various color reactions are produced on mixing 10 or 15 drops of the oil with 2 drops conc. sulphuric acid. See also *Heydenreich's* test.

Heijningen, Van- (QUININE). Ammonium-oxalate solut. affords a crystalline ppt.

Heinrich (GLUCOSE). Dissolve mercuric iodide, 18 Gm., and potassium iodide, 25 Gm., in sufficient water; then add caustic potassa and water to make 1,000 Cc. On heating some of this solut. with suspected liquid, reduction occurs if glucose present. See also *Sachsse's* solut.

Heinsius (ALBUMIN). Add 1 or 2 drops dil. acetic acid to 5 or 10 Cc. of suspected liquid and boil; then add sufficient sodium-chloride solut. to make liquid contain at least 4% sodium chloride—if any albumin present, it will be precipitated.

Heintz (POTASSIUM IN URINE). Acidulate 100 Cc. urine with hydrochloric acid, and add double the volume of a mixture of equal parts alcohol and ether containing some platinum chloride. In a few hours potassium-platinum chloride (and

also the corresponding ammonium salt) crystallizes as octahedra, which may be identified under the microscope.

Heintz-Ragsky (UREA). On heating urea with acids or caustic alkalies it is converted into ammonium carbonate. The CO_2 which may be liberated from the latter is used for calculating the quantity of urea that was present ($CH_4N_2O + 2H_2O = [NH_4]_2CO_3$).

Heise (KERMES COLORING IN WINE). Shake 20 Cc. of the wine with 10 Cc. of a 10-% alum solut. and 100 Cc. 10-% sodium-carbonate solut.; then exactly neutralize with the latter solut. The filtrate gives the following reactions if kermes coloring matter present: Amyl alcohol extracts no color from acid or alkaline solutions; a solut. acidulated with acetic acid is not altered by sodium bisulphite, or colored yellow by caustic alkali. The coloring matter of beet-root gives similar reactions.

Helch (PILOCARPINE HYDROCHLORATE). About 0.01-0.02 Gm. pilocarpine hydrochlorate (small quantities give to the benzene a distinct violet color, larger quantities a blue color) are dissolved in a little dist. water in a test-tube, 1 to 2 Cc. H_2O_2 of acid reaction added, the liquid then overlaid with about 2 Cc. benzene, and finally a few drops of a very dilute solution of $K_2Cr_2O_7$ (1 Cc. to contain about 0.003 Gm. $K_2Cr_2O_7$) are added. The mixture is immediately shaken carefully and allowed to settle; if pilocarpine hydrochlorate be present the benzene is colored very distinctly violet. The reaction is so sensitive that 0.01 Gm. is sufficient for detecting the presence of pilocarpine hydrochlorate. The author tested a whole series of substances, some alkaloids and their salts, and some of the newer remedies, but none of the substances examined afforded the violet color similar to that of pilocarpine, with the exception, however, of pyridine. Quinoline salicylate gives a dirty-violet, turbid color, which however completely vanishes, while antipyrine, migranine, and salipyrin, examined under conditions similar to those under which pilocarpine was examined, give a dark-blue color to the benzene, so that these above-named substances, by this test alone, can be distinguished from pilocarpine.

Heller (ALBUMIN IN URINE). Albuminous urine, when over-

laid upon heated nitric acid, shows a white zone at the point of contact.

Heller (BILIARY PIGMENTS). Mix 6 Cc. hydrochloric acid with enough urine to color, and allow nitric acid to flow down side and form a lower layer—a play of colors denotes presence of biliary pigments.

Heller (GLUCOSE). Glucose solutions or urine containing glucose are colored yellow to reddish-brown on heating with caustic potassa. See *Moore's* test.

Heller (HEMOGLOBIN). Urine rendered strongly alkaline with caustic-potassa solut. yields on boiling, when hemoglobin is present, a red ppt. of earthy phosphates.

Heller (INDICAN IN URINE). 1.—Add 4 Cc. urine to 2 Cc. conc. hydrochloric acid with constant stirring, and then let stand—a violet or blue develops if indican present. (If bile present, remove by pptn. with lead acetate, and filtration.) 2.—Gently heat 4 Cc. hydrochloric or nitric acid in test-tube, and overlay with urine free from albumin—a violet or blue color develops.

Heller (UROPHAINE IN URINE). Pour 4 Cc. urine upon 2 Cc. sulphuric acid in a beaker, from a height of about 4 inches—a black or opaque color indicates excess; a pale garnet-red diminution.

Heller-Moore (GLUCOSE). See *Moore-Heller.*

Heller-Teichmann (BLOOD IN URINE). Urine containing blood, when heated to boiling with a drop acetic acid, forms a brownish-red to blackish coagulum. If to boiling hot liquid a little caustic-soda solut. is added, it becomes clear and yields a sediment of earthy phosphates that, from the adhering coloring matter of the blood, appears red to brownish-red in transmitted, greenish by reflected light.

Helwig (BLOOD). Solut. potassium iodide, 1 part, in 4 parts water, removes dried-up and old blood stains, without altering coloring-matter of blood.

Helwig (SOLANINE). A cherry-red color develops on adding a mixture of equal volumes sulphuric acid and alcohol.

Hempel (IODIDES). A rose-red color develops on adding ferric-chloride solut., sulphuric acid and starch paste, to a liquid containing an iodide.

Hendrix (SANDAL OIL). Mix 0.5 Cc. oil with 2 Gm. solut. of 3 parts cryst. carbolic acid in 1 part alcohol, add 0.5 Gm. conc. hydrochloric acid and shake—pure sandal oil gives a yellow zone at contact-point; copaiva gives a mauve; cedar oil yields a milky solut. and brown color.

Henking (EXAMINATION LIQUID FOR OVA). Distilled water, 80 Cc.; glycerin, 16 Cc.; formic acid, 3 Cc.; osmic acid (1-%), 1 Cc.; dahlia, 0.04 Gm.

Henle (STAIN FOR NERVOUS TISSUE). Sections are left in palladium-chloride solut. (1:300 to 1:600) till they are of a straw color, then rinsed in water and stained with strong ammonia-carmine.

Henneguy (ALUM CARMINE). Excess of carmine is boiled in saturated solut. potassa alum, and 10% of glacial acetic acid added on cooling. Allow to settle for some days, and then filter.

Henneguy (PERMANGANATE METHOD). Treat sections for 5 minutes with 1-% potassium-permanganate solut.; then wash in water and stain with safranine, rubin, gentian violet, or vesuvine, preference being given to a safranine solut. prepared with aniline water.

Henninger (NITROBENZENE IN ESSENTIAL OIL ALMOND). Caustic-potassa solut. causes a green color.

Henocque (GOLD PROCESS). Impregnate tissues with a 0.5-% solut. gold chloride; then wash in water for 12 to 24 hours, and reduce with the aid of heat (40° to 50° C.) in nearly saturated solut. tartaric acid.

Henry (IODINE). Potassium-permanganate solut. liberates iodine.

Henry, De- (INDICATOR). By monochromatic light afforded by sodium flame, red litmus color appears colorless; the blue appears black.

Henry-Humbert (IODINE; BROMINE). Add acidified silver-nitrate solut. to water containing iodine or bromine; mix ppt. with silver cyanide, and pass current of dry chlorine over it—cyanogen iodide or bromide is formed.

Henzold (GELATIN IN FRUIT JELLIES). Boil material with water, filter, boil filtrate with excess of 10-% solut. potassium bichromate, cool, then add 2 or 3 drops conc. H_2SO_4—

if gelatin present a white flocculent ppt. forms and gradually collects in a lump at bottom of liquid. Pectinous matters from plants do not give the reaction.

Herapath (QUININE REACTION). Alcoholic solutions of quinine yield on addition of tincture of iodine a crystalline ppt. of quinine iodosulphate. This separates in thin plates, green at ordinary temperatures, brownish-red at 100° C. and possessing strong polarizing properties. For microscopical examination of the urine, the latter, after being rendered alkaline, is shaken out with ether, the ethereal solut. evaporated, and a portion of residue dissolved on a cover-glass in a drop of a mixture of 11.25 Gm. acetic acid, 3.75 Gm. alcohol, and 6 drops diluted sulphuric acid. To this is added a drop of tincture of iodine.

Herbst (ACONITINE). Upon carefully concentrating a phosphoric-acid solut. of aconitine containing aconine, a dirty-violet color is produced. Pure crystallized aconitine does not give this reaction.

Herbst (ATROPINE). On adding sulphuric acid, potassium bichromate (or ammonium molybdate) and a little water, odor of essential oil almond develops. Also known as *Herbst-Pfeiffer* test.

Hermann (FORMALDEHYDE SOLUTION). A 1-% solution, obtained by diluting formaldehyde with 40 volumes of water.

Hermann (PLATINO-ACETO-OSMIC MIXTURE). 15 parts 1-% platinic chloride solution, 1 part of glacial acetic acid, and 2 and 4 parts of 2-% osmic acid.

Hermann (TUBERCLE STAIN). Place cover-glass preparation in heated Hermann's solution for not longer than 1 minute, then for 4 to 5 seconds in 10-% HNO_3. Wash in 95-% alcohol, and after-stain in eosine (1 Gm. to 100 Cc. 60-% alcohol) for half a minute.

Hermann (VIOLET AMMONIA-CARBOLATE). *a*.—Crystal violet, 1 Gm.; 95-% alcohol, 30 Cc. *b*.—Ammonium carbonate, 1 1 Gm.; dist. water, 100 Cc. Add enough of solut. *a* to solut. *b* to produce a dense stain on filter-paper.

Hermann-Boettger (STAINING PROCESS). See *Flemming's* process.

Herse (CODEINE). Dissolve substance in sulphuric acid and add solut. ferric chloride—a blue color develops with codeine.

Hertwig (MACERATING FLUID). Mix equal parts of 0.05-% osmic acid and 0.2-% acetic acid. Medusæ are treated with this mixture for 2 or 3 minutes, then washed in 0.1-% acetic acid until free from osmic acid. Leave 24 hours in the dilute acetic acid, then wash in water, stain with Beale's carmine and mount in glycerin. For Actiniæ use 0.04-% osmic acid and make both solutions with sea water. Wash out with 0.2-% acetic acid, and stain with picro-carmine.

Hertz (VEGETABLE COLORING MATTER IN WINE). Shake 10 to 15 Cc. red wine with 5 Cc. sat. solut. tartar emetic—natural wine affords a cherry-red color by both reflected and transmitted light; foreign coloring matters give violet shades.

Herzberg (FREE ACIDS). Paper tinted with Congo red turns bluish to bluish-black in the presence of free acids.

Herzberg (PAPER). Wood pulp and jute give a lemon-yellow color with dilute solut. iodine in potassium iodide; linen, hemp and cotton papers, a brown color; while wood, cellulose, straw and esparto remain colorless. Strips of the paper are first boiled to a pulp with dilute potassa solut. and then washed free from alkali before applying reagent. Hemp, cotton, jute and linen give a yellow color with zinc-chloride-iodine solution; cellulose gives a bluish color.

Herzberg (TEST-PAPER). Congo-red papers (blue and red). Alkalies give a red color, and acids a blue. Also known as *Riegel's* paper.

Hesse (ALLIED ALKALOIDS IN QUININE). These alkaloids are less soluble in ether than quinine, while their sulphates are more readily soluble in water than the corresponding quinine salt. Shake 0.5 Gm. quinine sulphate with 10 Cc. water of 50° to 60° C.; after standing for 15 minutes, filter off 5 Cc., then add 1 Cc. ether (sp. gr. 0.7203) and 5 drops ammonia water (sp. gr. 0.96). The presence of quinidine, cinchonine, etc., is indicated by immediate or gradual formation of crystals in ethereal layer.

Hesse (CHOLESTERIN). See *Salkowski's* test.

Hesse (CODEINE). A blue color develops on dissolving in sulphuric acid and adding ferric-chloride solut.

Hesse (MORPHINE IN QUININE SULPHATE). Mix suspected sulphate with diluted nitric acid (1:4)—if morphine present yellowish to orange-red color develops.

Hesse (QUINIDINE). Treat 0.5 Gm. pure quinidine with a solut. of 0.5 Gm. potassium iodide in 10 Cc. hot water, filter after 1 hour, and then add 1 drop of ammonia—no cloudiness should be produced.

Hessert (STAINING FLAGELLA). Fix film by treating cover-glass preparations with a saturated alcoholic solut. mercuric chloride, wash, and stain for 30 or 40 minutes in a hot 10-% aqueous or saturated alcoholic solut. fuchsine.

Heurck, Van- (MOUNTING MEDIUM). This is simply monobromide of naphtalin.

Heuschen (AMYGDALIN). Reduce suspected substance to fine powder, then add a little chalk, coarse rye flour, and water, and allow to ferment. If amygdalin present hydrocyanic acid will be evolved and stain cuprous guaiac paper blue.

Heut (DIFFERENTIATING CONIINE AND NICOTINE). Add 1 drop conc. alcoholic solut. phenolphtalein to suspected liquid—no reaction occurs with nicotine, but if trace of coniine present a red color develops; difference more marked on adding chloroform.

Heydenreich (COTTONSEED OIL IN OLIVE OIL). Allow a few drops of the oil to fall on some pure sulphuric acid in a porcelain capsule—with pure olive oil, the point of contact is yellowish-green; with foreign oils (cottonseed oil) it is yellowish-orange to brown.

Heynsius (ALBUMIN IN URINE). Boil 5 to 10 Cc. of filtered urine with a few drops diluted acetic acid and then add a saturated solut. common salt—a white ppt. results if albumin present.

Hickson (EOSINE-HEMATOXYLIN METHOD). Stain sections on slide for 1 hour with a strong solut. eosine in 90-% alcohol, then wash with alcohol and stain for 20 minutes in a weak solut. of hematoxylin.

Hilger (ALBUMIN). A ppt. forms on acidifying with acetic acid and adding potassium-ferrocyanide solut.

Hilger (ARSENIC). A black stain develops on acidifying strongly with hydrochloric acid, adding excess of aqueous iodine solut., introducing a piece of pure zinc, and exposing silver-nitrate paper to the gas evolved.

Hilger (BILIARY PIGMENTS). Ppt. coloring matter by boiling with barium hydrate. The yellow ppt. filtered off and washed, gives the following reactions: With alcohol and a few drops of sulphuric acid, ppt. becomes colorless while the solution becomes green; with nitric acid containing nitrous acid, green and blue colors result.

Hilger (IODIC ACID IN NITRIC ACID). On diluting with water and shaking with 25% carbon disulphide, in presence of a few pieces of rasped tin, the disulphide is colored violet.

Hilger-Mai (KERMES COLORING IN WINE). Mix 5 Cc. of wine with 10 drops of a 5-% solut. of iodine in potassium iodide, filter mixture after standing for 2 hours, and treat filtrate with sodium thiosulphate in excess. Natural wine is decolorized, but kermes gives a red color not destroyed on addition of sulphuric acid.

Himmelmann (ARSENIC). This is Marsh's method, modified by substitution for the acid and zinc of an ammoniacal solut. ammonium chloride which has been heated gently with a mixture of equal parts granulated zinc and powdered iron. The liquid containing arsenic is made neutral or alkaline before adding, and arseniuretted hydrogen is evolved.

Himly (ILLUMINATING GAS IN WATER). Add chlorine water to suspected liquid, expose to sunlight, and remove free chlorine by adding mercury or mercury oxide. If mixture exhibits an odor of ethylene chloride or similar compound, illuminating gas was present in the water. At least 500 Cc. water should be used in this test.

Himly (MINERAL SUBSTANCES IN FLOUR). Shake the flour with chloroform, allow to deposit, and examine sediment.

Himly (OILED WHEAT). On shaking the grain with bronze powder and rubbing with filter-paper only the oiled grains will appear bronzed.

Hindenlang (ALBUMIN IN URINE). Strong metaphosphoric acid causes an opalescent cloudiness or produces a ppt. in urine containing albumin.

Hinsberg-Autenrieth (PHENACETIN). See *Autenrieth-Hinsberg.*

Hinterberger (ATROPINE). A blood-red color develops on passing a current of cyanogen into an alcoholic solut. of atropine.

Hirsch (PHENOL). A purple color develops on adding tincture of ferric chloride to an aqueous solut. of phenol.

Hirschsohn (ACETANILID IN PHENACETIN). 0.1 Gm. phenacetin is dissolved in 10 Cc. water, the solut. filtered after cooling, and treated with bromine water until a yellow color results. If the solut. becomes turbid, acetanilid was present (formation of parabromacetanilid).

Hirschsohn (ALOES). 1.—1 drop 10-% solut. $CuSO_4$ and 1 drop H_2O_2 added to 10 Cc. aq. 1:1,000 solut. aloes gives on boiling, a raspberry-red color with all varieties of aloes. 2.—Boil 10 Cc. aloes solut. with 1 drop $CuSO_4$ solut. and 1 drop 1:15 solut. potass. ferricyanide, and filter—filtrate is either yellowish or pink (latter is afforded by Curaçao, Barbadoes, Zanzibar and Natal aloes). 3.—Curaçao and Barbadoes aloes give with $CuSO_4$ and potass. sulphocyanate a raspberry-red color at ordinary temperatures but much more pronounced on heating. 4.—Natal aloes boiled with borax solut. gives a red color. 5.—Tinct. aloes, after exposure to sunlight for some time, no longer affords the reaction with $CuSO_4$ and H_2O_2.

Hirschsohn (BENZOINS). Siam benzoin is colored cherry-red by conc. sulphuric acid; other benzoins are colored brownish-red. Siam benzoin with sulphuric acid gives a clear, violet solution on admixture of alcohol, and on adding water next, violet-red flocks form. Sumatra and Penang benzoins treated similarly give reddish-violet solutions and dirty-violet flocks.

Hirschsohn (CASSIA OIL). Run 10 Cc. oil into a special flask with narrow neck graduated to 6 Cc. in tenths, and nearly fill flask with almost boiling sodium-bisulphite solut. Shake well, and when reaction moderates add more hot bisulphite, then immerse flask in boiling water until non-aldehydes have separated as a perfectly clear layer. Adjust lower surface of layer to zero mark on scale by adding more bisulphite, and read off the volume. The difference between this and 10 Cc. represents quantity of cinnamic aldehyde in oil.

Hirschsohn (CHLORAL ALCOHOLATE IN CHLORAL HYDRATE). 1 Gm. chloral hydrate is tested with 1 Cc. nitric acid (sp. gr. 1.38). If at ordinary temperatures, or upon warming, a yellow color results within 10 minutes, alcoholate was present.

Hirschsohn (COTTONSEED OIL). Heat 5 Cc. of oil for 20 minutes on the water-bath with 6 to 10 drops of a solut. of 1 Gm. gold chloride in 200 Cc. chloroform—presence of cottonseed oil is indicated by development of a red color.

Hirschsohn (DIFFERENTIATING TARS). 1.—Completely soluble in 95-% acetic acid.

(*A*): Turpentine oil (French) dissolves it completely. The petroleum-ether extract of the tar is colored greenish by shaking with a diluted solut. (1:1,000) of copper acetate. Chloroform and absolute ether dissolve it completely.... Pine tar

(*B*): Turpentine oil dissolves it only partially. The petroleum-ether extract is not colored by copper-acetate solut. Chloroform and absolute ether do not entirely dissolve it..... Beech tar

2.—Not completely soluble in 95-% acetic acid.

(*A*): Turpentine oil dissolves it completely. [*a*]: Aniline dissolves it completely. Aqueous extract (1:20) yields a red color with ferric-chloride solut. (1:1,000)..... Juniper tar

[*b*]: Aniline does not dissolve it completely. The aqueous extract is colored greenish by ferric chloride.. Birch tar

(*B*): Turpentine oil dissolves it only partially. Benzene, chloroform, ether, and olive oil dissolve it only partially..... Aspen tar

Hirschsohn (DRAGON'S BLOOD). The alcoholic extract has a pure red color; that of other resins is usually reddish-yellow.

Hirschsohn (FATTY OILS IN BALSAM OF COPAIBA). 20 to 40 drops of the balsam are boiled with 1 to 2 Cc. of a solut. of 1 part NaOH in 5 parts 95-% alcohol. The presence of oil is indicated by gelatinous ppt. or turbidity on cooling, or upon addition of 2 volumes of ether. Pure copaiba balsam with 3 volumes of 90-% alcohol should yield a mixture from which no oil globules should separate within an hour.

Hirschsohn (GURJUN BALSAM IN COPAIBA BALSAM). 1 volume of balsam, 3 volumes 95-% alcohol and 1 Gm. crystallized stannous chloride are boiled together until a complete solut.

results. Admixtures of gurjun balsam are shown by appearance of a red color, changing to blue on standing some time.

Hirschsohn (GURJUN BALSAM). Two Cc. solut. conc. sulphuric acid in acetic ether (1 + 5), added to 3 to 4 drops gurjun balsam, causes a violet color. For testing copaiba balsam, 6 to 8 drops of balsam are added to a solut. of 2 drops sulphuric acid in 4 Cc. acetic ether—a violet color indicates presence of gurjun balsam.

Hirschsohn (PERU BALSAM). 1.—Balsam heated on water-bath half an hour with half its volume calcium hydrate should not solidify. 2.—One volume balsam with 4 volumes 80-% acetic acid must give only an opalescent or cloudy solution from which no oily drops should separate in 2 hours. 3.—The petroleum-ether extract shaken with copper-acetate solut. (1:1,000) must not be colored bluish-green or green. 4.—Residue from petroleum-ether extract should not be colored by hydrochloric acid, sp. gr. 1.19.

Hirschsohn (QUININE AND QUINIDINE). Reaction consists in the addition of one drop H_2O_2 solut. (about 2-%) and 1 drop of 10-% $CuSO_4$ solut. to the neutral alkaloidal solut. (chloride or sulphate); on boiling, an intense raspberry-red color appears, changing to bluish violet, then blue, and, after a while, slowly to green. The limit of sensibility is 1:10,000. As in every such test it is highly important to know upon what other substances it has been tried, the following list increases the value of the reaction very considerably: A colorless or only faintly yellow solution is obtained with antipyrine, atropine, aconitine, acolyctine, asaron, brucine, berberine, bebeerine, caffeine, cocaine, cinchonidine, cinchonine, cinchonamine, cinchotenine, codeine, colchicine, colocynthin, convallamarin, convallarin, coumarin, cubebin, caryophyllin, delphinine, daturine, digitin, digitalin, duboisine, gelsemine, helenin, hyoscine, hyoscamine, kosin, meconin, minispermine, piperin, picrotoxin, pilocarpine, quassiin, quinoline, solanine, saponin, santonin, salicin, senegin, scoparine, sabadilline, sparteine, strychnine, taxine, theobromine, urson, vanillin, and veratrine. The following give yellow to brown: Analgen, apomorphine, arbutin, æsculin, chelerythrine, cotoin, duboisine (amorphous), eserine, hydrastine, hydrastinine, mor-

phine, narceine, narcotine, paracotoin, papaverine, peucedanin, phloridzin and pyrodin. A light onion-red is produced by thalline, an intense blue by kairine, and a light blue by asparagine. The peculiar raspberry-red tint is observed with euquinine, but only feebly, so that this color when strongly developed seems quite characteristic of quinine or quinidine.

Hirschsohn (ROSIN IN GUAIAC RESIN AND BALSAM OF TOLU). The finely-powdered sample is shaken for 10 to 15 minutes with 4 to 5 times its weight petroleum ether; aqueous copper-acetate solut. causes a green color in filtrate if rosin present.

Histed (ALOINS). On adding a few grains barbaloin to several drops of conc. sulphuric acid and gently passing over the surface a glass rod moistened with nitric acid, a red color develops; nataloin causes a blue color.

Histed (NATALOIN). If nataloin is dissolved in conc. sulphuric acid and a small fragment potassium nitrate added, a green color develops, changing to red and then to blue.

Hlasiwetz (HYDROCYANIC ACID). If an alkaline cyanide solution is warmed with picric acid, a blood-red color results.

Hoehnel, Von- (LIGNIN). Phenol-hydrochloric acid (highly conc. sclut. of phenol in fuming hydrochloric acid) gives a green color with lignin.

Hoehnel, Von- (SILK). A saturated solut. chromic acid diluted with an equal volume of water. Mulberry-red silk is dissolved by heating for less than a minute in this solut.; wild silk is insoluble in the reagent; sheep's wool is dissolved like mulberry silk.

Hofer (NARCOTIZATION SOLUTION). Dissolve hydroxylamine hydrochlorate (or sulphate) in water, neutralize with sodium carbonate and dilute to a 1-% solut. Solut. is further reduced, according to organisms to be killed.

Hoffmann (ALBUMINS AND PHENOLS). Solut. of mercuric nitrate containing a trace of free nitrous acid. Yields similar color reactions as *Millon's* reagent. See *Hoffman's* reaction for tyrosin.

Hoffmann (ALBUMIN TEST-PAPER). *a.*—Dissolve corrosive sublimate, 1 part, in distilled water, 20 parts. *b.*—Dissolve potassium iodide, 1 part, in distilled water, 2 parts. Mix solutions; impregnate paper with mixture and dry. Pre-

pared paper, dipped into albuminous urine immediately causes a ppt. in acid urine—if necessary, add a little acetic acid.

Hoffmann (ALKALOIDS AND ANILINE SALTS). 1.—Aniline salts are distinguished from alkaloids by not affording ppts. with potassium iodide, potassium-cadmium iodide, and mercury-potassium iodide, but giving with solut. of sodium phospho-molybdate in sulphuric or oxalic-acid solut. a ppt. at first yellow, then blue, and yielding a blue solution with ammonia water. 2.—Tannic acid only partially ppts. aniline salts. 2.—Alcoholic mercury-chloride solut. causes in alcoholic aniline solut. a white, crystalline ppt. nearly insol. in water.

Hoffmann (ANILINE REACTION). With fuming nitric acid, aniline gives a deep blue solution, becoming yellow and finally red upon warming.

Hoffmann (BENZENE). Heat with fuming nitric acid, subject the resulting nitrobenzene to the action of alcohol, hydrochloric acid, and granulated zinc, then test the aniline produced with chlorinated lime.

Hoffmann (BLUE STAIN). Hoffmann's blue, 1 Gm.; alcohol, 20 Cc.; distilled water, 80 Cc.; glacial acetic acid, 0.5 Cc. As a nuclear stain immerse sections for 10 minutes, rinse in water, wash in 90-% alcohol, dehydrate, clear, and mount in balsam. To stain sieve areas, stain sections 5 or 10 minutes, rinse in distilled water, and mount in glycerin; or, dehydrate, clear, and mount in balsam.

Hoffmann (CARBON DISULPHIDE). Triethyl phosphine gives a rose-red color.

Hoffmann (CHLOROFORM). 1.—Isonitrile is formed on adding aniline, alcohol, and soda. 2.—When a trace of ammonium chloride and ferrous chloride is warmed with an excess of alcoholic potassa solution and a few drops chloroform, and the mixture then diluted with water and acidified with hydrochloric acid, a greenish-blue color results.

Hoffmann (INDICATOR). The color of eupittonic acid is changed from yellow to blue by alkalies, and to red by acids.

Hoffmann (PHENOL). Cautiously overlay 2 Cc. of the liquid on an equal volume sulphuric acid, and drop into the liquid

a few crystals potassium nitrate—the violet color may appear in streaks.

Hoffmann (PRIMARY AMINES). 1.—These yield upon warming with chloroform and alcoholic potassa solution the characteristic odor of isonitrile. 2.—On evaporating an ethereal solution of a primary amine base with carbon disulphide, dissolving the residue in water, and boiling solut. with silver nitrate, mercuric chloride, or ferric chloride, an odor of mustard oil develops.

Hoffmann (TYROSIN). The hot aqueous solution of tyrosin (obtained from the urine sediment) yields a red color and ppt. on addition of a solut. of mercuric nitrate with some potassium nitrate.

Hoffmann-Ultzmann (BILIFUSCIN). Dip piece of clean white linen in urine and allow to dry. Linen is colored brown if bilifuscin present.

Hoffmeister (CELLULOSE SOLVENT). Mixture consists of hydrochloric acid and potassium chlorate.

Hofmeister (CREATIN). Phosphotungstic acid gives a readily soluble, crystallizable compound with creatin; with creatinine a difficultly soluble compound is formed.

Hofmeister (LEUCINE). Heat solut. with mercurous nitrate—if leucine is present, a deposit of metallic mercury forms.

Hofmeister (PRECIPITANT FOR PEPTONE). Commercial sodium tungstate is dissolved in hot water, phosphoric acid added to acid reaction, then strongly acidulated with hydrochloric acid and filtered after standing 24 hours.

Hoggan (FERRIC-CHLORIDE STAIN). Treat tissue first with silver-nitrate solut. (previously exposed for a short time to diffused light), then dehydrate in alcohol, and then treat for a few minutes with 2-% alcoholic solut. ferric chloride. Next treat with 2-% alcoholic solut. pyrogallic acid, and when dark enough, wash in water and mount in glycerin.

Holde (TARRY CONSTITUENTS OF LUBRICANTS OBTAINED FROM PETROLEUM). Dissolve in petroleum ether in which the tarry admixtures are insoluble.

Holde (UNSAPONIFIABLE SUBSTANCES IN FATS). Boil a piece of caustic potassa the size of a pea in 5 Cc. absolute alcohol until completely dissolved, add 3 to 4 drops of the fat, and

then boil the whole for 1 minute. Upon diluting with 3 to 4 Cc. of water, a turbidity indicates the presence of an unsaponifiable substance.

Honsell (SMEGMA BACILLUS STAIN). Stain in boiling carbol-fuchsine 2 min., rinse in water, dry, treat with a mixture of 97 parts alcohol and 3 parts HCl for 10 min., rinse in water, counterstain in equal parts of saturated alcoholic solut. methylene blue and water. Only tubercle bacilli are stained red, smegma bacilli are not.

Hopkins (URIC ACID). Saturate 100 Cc. urine with finely powdered ammonium chloride (about 30 Gm.) let stand 2 hours with occasional stirring, then filter, and wash with saturated solut. ammonium chloride; then rinse off filter with hot water, heat just to boiling with excess dilute HCl, cool, and let stand 2 hours. Collect crystals of uric acid, wash twice with cold water, then with alcohol, until free from acidity, dry at 100° C., and weigh. Add 0.001 Gm. for every 15 Cc. of mother liquor. If preferred, the acid ammonium-urate ppt. from above may be titrated. Treat ppt. obtained as above from 200 Cc. urine with known volume decinormal sulphuric acid, boil, cool, dilute to 200 Cc., add little methyl orange, and titrate back with semi-decinormal alkali. Difference between volume required and volume of acid solut. represents ammonia of ppt., the uric acid having no action on methyl orange. Each Cc. semi-decinormal soda solut. = 0.0084 Gm. uric acid.

Hoppe-Seyler (BILIARY PIGMENTS). Ppt. urine with milk-of-lime, then ppt. the lime with carbonic acid, filter off, and wash the ppt. with water. If nitroso-nitric acid is dropped upon the ppt. in the filter, the well-known color reactions are produced if biliary pigments are present. See *Gmelin's* test.

Hoppe-Seyler (CARBON-MONOXIDE POISONING). A few drops of the blood to be tested are mixed in a porcelain capsule with an equal or double quantity of conc. caustic-soda solut.—blood containing carbon monoxide will appear of a vermilion color in thin layers, while normal blood will appear a dirty brownish-green.

Hoppe-Seyler (PHENOL). A pine shaving is colored blue when moistened with phenol and hydrochloric acid. *Tommasi's*

modification: Instead of hydrochloric acid, a mixture of 50 Cc. hydrochloric acid, 50 Cc. water, and 0.2 Gm. potassium chlorate is used.

Hoppe-Seyler (SANTONIN IN URINE). Treat urine with caustic soda—a red color develops; add amylic alcohol—red color disappears (distinction from chrysophanic acid, which amylic alcohol does not decolorize).

Hoppe-Seyler (SUGAR IN THE URINE). Test depends upon formation of indigo upon warming urine containing glucose with orthonitrophenylpropiolic acid. Reagent employed is a 0.5-% solut. of this acid in soda lye. Five Cc. of the solut. are boiled with 10 drops urine; sugar, if present, develops an indigo color.

Hoppe-Seyler (XANTHINE). Calcium chloride and sodium-hydrate solut. added to a solut. containing xanthine, give at zone of contact a dark green color, quickly changing to brown, and finally disappearing.

Horsford (GLYCOCOLL). A bright red color develops on heating with potassium-hydroxide solut.

Horsley (ALKALOIDS). Sodium nitroprussiate yields crystalline precipitates.

Horsley (GLUCOSE). 1.—Dissolve copper sulphate, 30, in water, 1440, add tartaric acid, 30, and cool; then add potassium hydroxide, 90, and potassium carbonate, 90. This solut. is reduced by glucose. 2.—A green color develops on boiling glucose with a solut. of potassium chromate containing free alkali.

Horsley (MORPHINE). 1.—A red color forms several hours after adding potassium-ferricyanide solut. 2.—A blood-red color develops on adding a few drops silver-nitrate solut. and adding nitric acid to filtrate after reduction of the silver.

Horsley (NITRIC ACID). Pyrogallic and sulphuric acids yield a violet color with aqueous solutions containing traces of a nitrate.

Horsley (STRYCHNINE). A purple-violet to red color forms on adding potassium-bichromate solut. to a solut. of a strychnine salt, and, after separation of crystals, adding a drop of sulphuric acid.

Hosaeus (BORAX OR SODIUM BICARBONATE IN MILK). Add

0.1 Gm. tartaric acid to 100 Cc. milk, shake, and heat—if milk does not curdle, the presence of borax or sodium bicarbonate may be assumed.

Houzeau (OZONE PAPER). This is red litmus paper, one-half of which has been saturated with potassium-iodide solution. Since ozone liberates free alkali from potassium iodide, the paper will turn blue in the presence of this gas.

How (ALKALOIDS). Distinctive color reactions are obtained on adding sulphuric acid and ferric chloride. See "*Proc. Am. Phar. Assoc.*," 1878.

Howie (CURCUMA). 0.3 Gm. of the powdered rhubarb or insect powder to be tested are heaped upon filter-paper, 50 drops chloroform gradually dropped upon it, and after drying and removing the powder, a small piece of borax is placed upon the spot and a drop of HCl added. The appearance of the well-known red color indicates curcuma. *Maisch's* test is similar.

Hoyer (BERLIN-BLUE GELATIN MASS). Freshly precipitated Berlin blue is placed on a dialyzer with a little water, and the external water changed until the solut. begins to pass through the parchment. Then dilute the solut. and filter through paper. Next heat almost to boiling and add gradually a warm, thin solut. of gelatin, until coagulation begins to set in; then strain through wetted flannel.

Hoyer (CARMINE). Heat 1 Gm. on a sand-bath with 1 to 2 Cc. strong ammonia and 6 to 8 Cc. distilled water, until the excess of ammonia is driven off. When the solution becomes clear red, allow to cool, and filter off ppt. To the filtrate, which should be quite neutral, add 4 to 6 times its volume absolute alcohol, and collect the clear red ppt. which is thrown down. When required for use, dissolve this powder in water and add 1 to 2% chloral hydrate to make the solution permanent.

Hoyer (CARMINE GELATIN MASS). Mix equal parts of conc. gelatin solut. and neutral carmine as above, digest in a water-bath until the dark violet-red tint begins to change to bright red, then add 5 to 10% glycerin and at least 2% by weight chloral hydrate in conc. solut. Filter through flannel and keep in an open vessel under a bell-glass.

Hoyer (GOLD STAIN). A 0.5-% solut. of gold and potassium chloride is used instead of gold chloride only.

Hoyer (LEAD-CHROMATE GELATIN MASS). Filter 1 volume 20-% gelatin solut., add 1 volume cold sat. potassium-bichromate solut., then warm almost to boiling and add gradually 1 volume cold sat. neutral lead-acetate solut., which has been previously warmed. Or, mix the lead-acetate solut. with part of the gelatin solut., mix the bichromate solut. with the remainder, heat the latter mixture, and gradually pour into it the first mixture, stirring continually.

Hoyer (MOUNTING MEDIUM). Dissolve acacia in a conc. solut. of chloral hydrate containing 5- to 10% glycerin to form a thick syrupy fluid, which should subsequently be filtered through thick swansdown. This form of the medium answers with objects stained with carmine or hematoxylin, but if aniline stains be employed the gum should be dissolved in a 50-% solut. potassium acetate, or solut. ammonium acetate prepared by neutralizing 10 Gm. concent. ammonia with acetic acid and making up with water to 30 Gm.

Hoyer (SHELLAC INJECTION MASS). Dissolve shellac in 80-% alcohol to the consistency of a thin syrup, and strain through muslin of medium thickness. Color with aniline color in alcoholic solution, or by means of vermilion or other pigment suspended in alcohol.

Hoyer (SILVER-NITRATE GELATIN MASS). Mix a conc. solut. of gelatin with an equal volume of a 4-% silver-nitrate solut. and warm, then add a very small quantity of aqueous pyrogallic-acid solut. to reduce the silver salt, and add chloral and glycerin as in the carmine gelatin mass.

Hoyer (SILVER STAIN). Add ammonia to a solut. of silver nitrate of known strength, until the ppt. formed just re-dissolves, then dilute the solut. until it contains 0.5 to 0.75% of the salt

Huber (FREE MINERAL ACIDS). The reagent is an aqueous solut. containing 50% each of ammonium molybdate and potassium ferrocyanide. Mineral acids yield with reagent a red turbidity or brown precipitate, depending upon the quantity present. Boric and arsenous acids do not give this reaction.

Huebl (IODINE NUMBER). This serves for the estimation of unsaturated compounds in a substance (oils, rosin, etc.), and depends upon the power of these compounds of forming iodine-compounds. The iodine number of a substance is the quantity of iodine which 100 parts of the substance will take up.

Huebl (SOLUTION FOR TESTING OILS). The solut., which is that used in the "iodine absorption test," is thus prepared: Iodine, 25 Gm. is dissolved in 500 Cc. 95-% alcohol; mercuric chloride, 30 Gm., is dissolved in a similar quantity of alcohol, and the two solutions are mixed. The reagent is thus applied: About 0.25 to 0.5 Gm. of the oil are accurately weighed and dissolved in 10 Cc. chloroform in a 250-Cc. stoppered flask, and 25 Cc. of the Huebl reagent is run in. At the same time a blank experiment under similar conditions, but without any oil, is started. After standing in the dark for not less than 4 hours (preferably over night), 20 Cc. of 10-% potassium-iodide solut. are added to each, and 150 Cc. water. The uncombined iodine is then titrated with thiosulphate, the difference between two flasks showing the amount of iodine absorbed.

Huebl-Waller (IODINE SOLUTION). Similar to the above, but with addition of 25 Gm. hydrochloric acid, sp. gr. 1.19, to the mercuric-chloride solut.; this modified reagent is much more permanent than the original Huebl solution.

Huefner (UREA). A recently prepared sodium-hypobromite solut., made by adding 25 Gm. bromine all at once to a cooled solution of 100 Gm. sodium hydrate in 250 Gm. of water, decomposes urea into carbonic acid and nitrogen, the former being absorbed by the caustic soda, while the latter is measured in a suitable apparatus (*Knop's* azotometer, *Esbach's* ureometer), and the quantity of urea thus quantitatively estimated.

Huehnefeld (BLOOD IN URINE). Acetic acid, 2, distilled water, 1, are each mixed with alcohol, 100, and turpentine, 100; 1 Cc. of the mixture and 1 Cc. tincture guaiac are mixed together and 3 to 4 Cc. urine added; if blood present, a blue zone is formed.

Huehnefeld (TURPENTINE SOLUTION FOR TESTING FOR BLOOD). Ten volumes each of oil turpentine, alcohol, and

chloroform, are mixed with one volume glacial acetic acid, and then water added drop by drop so long as the liquid remains clear. The liquid to be tested for blood (urine) is mixed with a few drops reagent and a few drops tincture guaiac added—a dark blue color of the silky mixture indicates blood. According to *Schar*, test is applied by adding to suspected liquid a 1-% solut. of guaiac resin in absolute alcohol, and shaking resulting ppt., after filtration, with the *Huehnefeld* turpentine solution.

Huizinga (GLUCOSE). Add caustic potassa, then ammonium molybdate (or tungstate), boil, and then add hydrochloric acid—a blue color develops if glucose present.

Humbert-Henry (IODINE; BROMINE). See *Henry-Humbert.*

Hume (ARSENIC). A yellow ppt. forms on passing arseniuretted hydrogen into ammoniacal silver-nitrate solut.

Hume (FREE MINERAL ACIDS). Free mineral acids in vinegar give distinctive color reactions when 2 drops vinegar are added to residue left on evaporating a neutral solut. of ammonium molybdate to dryness on platinum foil, heating till barely moist, and then cooling.

Hummel (BUTTER). Press bit of butter to a thin film between cover-glass and glass slide, and examine with polarizing microscope having a selenite plate between slide and lower nichol. Normal butters give uniformly blue-colored field with absence of fat crystals; renovated butters give blue field mottled with yellow.

Huppert (BILIARY PIGMENTS). Urine is treated with milk-of-lime or with calcium chloride and ammonia, whereby, in the presence of biliary pigments, a yellow ppt. of bilirubin-lime is formed. Hot alcohol, containing sulphuric acid, dissolves this, forming a green solution. After administration of senna or rhubarb, the ppt. with lime is of a rose-red color, the acidified alcoholic solut. being orange-yellow.

Husemann (MORPHINE REACTION). Morphine is warmed with conc. sulphuric acid and, after cooling, treated with a drop of nitric acid—a beautiful dark-violet color results, changing to a blood-red and gradually fading.

Hyatt (SHELLAC METHOD FOR HARD, CHITINOUS OBJECTS). Soak in alcohol, then immerse in a clear, alcoholic solut,

shellac for a day or two, then imbed with plenty thick shellac solut. in a groove in one-half of a soft-wood cylinder split in two for the purpose. Tie the two halves of the cylinder together, and when the shellac has become quite hard, fix the cylinder in a microtome, soak with warm water, and cut the sections.

Hyde (THALLEIOQUIN REACTION). See *Brand's* test.

Ide (IMBEDDING METHOD). Imbed object in collodion in a tube by Gilson's method, boil collodion for 40 minutes, next bring for 15 minutes into chloroform heated to 30° C. and containing one-fourth part of paraffin, then place for 10 minutes in pure melted paraffin.

Ihl-Pechmann (LEVULOSE). 1.—Warm substance with conc. alcoholic solut. resorcin containing a little hydrochloric acid—a red color develops. 2.—Add substance to a conc. solut. diphenylamine, then add hydrochloric acid, and boil—a yellowish-green, then dark-blue color appears.

Ilimow (ALBUMIN IN URINE). Cloudiness and a flocculent deposit appear on acidifying the urine, if necessary, with sodium acid phosphate, allowing to settle, cooling, and filtering, then adding diluted carbolic acid (1 : 20).

Israel (ORCEIN STAIN). Orcein, 2 Gm.; glacial acetic acid, 2 Gm.; distilled water, 100 Cc. After staining in this, wash object in distilled water, and pass rapidly through absolute alcohol to thick cedar oil, in which it should be mounted.

Istrati (ALDEHYDES IN ALCOHOL). Add 0.2 Cc. of a satur. alcoholic solut. of a phenol to 2 Cc. of the alcohol to be examined, then add 1 Cc. conc. sulphuric acid. Different phenols give various color reactions, for which see MERCK'S REPORT, IX, p. 23.

Ittner (HYDROCYANIC-ACID REACTION). An alkali-cyanide solution when mixed with a solution of a ferroso-ferric salt, yields a precipitate of Prussian blue.

Jack (SUGAR IN THE URINE). Phenylhydrazine forms with sugar a difficultly soluble osazone. See also *Fischer's* test.

Jackson (TITANIUM). On adding hydrogen dioxide to a solut. of titanium in hydrochloric or sulphuric acid, a yellow to orange color develops.

Jacob (FREEZING MASS). Acacia, 5 parts; tragacanth, 1 part; gelatin, 1 part; warm water containing one-sixth part of glycerin, enough to form a thin jelly when cold.

Jacobsen (FATTY OILS.) Bring fatty oils in contact with rosaniline acetate, which is insoluble in neutral fats, but is dissolved by free fatty acids.

Jacqemart (ETHYL AND METHYL ALCOHOLS). Upon heating ethyl alcohol with a solut. mercuric nitrate, the mercuric salt is reduced and a black ppt. results on adding ammonia. Methyl alcohol does not give this reaction.

Jacquemin (ALKALIES AND ALKALOIDS). A solut. of pyrogallol containing ferric chloride is turned blue by alkalies or alkaloids.

Jacquemin (ANILINE REACTION). A very dilute aqueous solution of aniline treated with a chlorinated-lime solut. and then a few drops of a very dilute ammonium-sulphide solut., develops a rose-red color even in dilutions of 1 : 250,000.

Jacquemin (IODINE). Pyrogallol gives a brown color with iodine.

Jacquemin (NITROBENZENE). On adding solut. stannous chloride in caustic soda, aniline is formed, and a blue color develops on adding carbolic acid and chlorinated-soda solut.

Jacquemin (PHENOL REACTION). A little aniline and a few drops of a sodium-hypochlorite solut. cause a blue color, changed to a red upon the addition of acids, if a phenol is present.

Jacquemin (WOOL, SILK AND COTTON). Wash textile fabric in warm dilute solut. chromic acid, then wash with water—wool and silk are dyed; cotton is not.

Jaeger (GLYCERIN MEDIUM). Glycerin, 1 part; alcohol, 1 part; sea-water, 10 parts.

Jaffe (CREATININE). Urine containing creatinine gives, with an aqueous solut. of picric acid and a few drops soda lye, a red color which becomes yellow on adding acid. See also *Weyl's* test.

Jaffe (INDICAN IN URINE). Mix urine with equal volume conc. H_2SO_4, add a few Cc. chloroform, and then solut. chlorinated lime or Javelle water by drops, shaking after each addition—the chloroform is gradually colored blue. Slight excess of chlorinated lime does no harm, but large excess interferes with test.

Jahr's test for determining the melting-point of butter. See *Drouot's* test.

Jaillard (ROSE-GERANIUM OIL). Add 6 drops oil to 5 Cc. 70-% alcohol—complete solut. should result.

Jakimovitch (SILVER PROCESS). Stain dark-brown with silver stain, then expose to light for 5 to 7 days in a mixture of formic acid, 1 part; amyl alcohol, 1 part; and water, 100 parts. Renew mixture from time to time, and when all the mixture is dissolved a darker color is permanently assumed.

Jakobsohn (STAIN FOR EPITHELIA IN URINE). Add a 1-% solut. sodium-alizarin monosulphonate to 1 drop recently-centrifugated sediment. Thymol may be used for preservation of urine.

Jaksch, Von- (BILIRUBIN IN BLOOD). Place blood in test-tube in refrigerator; after coagulation, withdraw serum into test-tube, and shake—a yellow froth indicates bilirubin. Serum becomes green if placed in warm place for 3 or 4 hours.

Jaksch, Von- (DIACETIC ACID IN URINE). Add solut. ferric chloride to urine, filter, then add more reagent, and boil portion of the mixture—the red color should persist. To another portion of urine add sulphuric acid and ether, then apply ferric-chloride test to ethereal extract.

Jaksch, Von- (MELANIN IN URINE). Add a few drops conc. ferric-chloride solut.—melanin gives a gray reaction, and ppt. formed is soluble in excess of reagent.

Jaksch, Von- (PARA-CRESOL). Add sodium nitro-prussiate and caustic potassa to solut.—a reddish-yellow develops, changed to light pink on addition of acetic acid.

Jaksch, Von- (THALLINE). Shake urine with ether, and add ferric-chloride solut. to ethereal extract—a dark-green color develops.

Jaksch, Von- (SUGAR IN URINE). Free 50 Cc. urine from albumin, add 2 Gm. sodium acetate and 1 or 2 Gm. phenylhydrazine hydrochlorate, and heat to 100° C.—on cooling, phenyl-glucosazone crystallizes out.

Jaksch, Von- (URIC ACID). Modified murexid test, bromine or chlorine water or nitrous acid being used as oxidizer.

James (SLIDE-CLEANING MIXTURE). Equal parts benzin, turpentine, and alcohol.

Jandrier (COTTON IN WOOLEN FABRICS). Wash sample of fabric, and treat with sulphuric acid (20 Bé.) for half hour on water-bath. To 1 or 2 Cc. of this solut. add 0.01 Gm. resorcin, and overlay on conc. sulphuric acid free from nitrous products. Heat developed is sufficient to give a color at contact-point of the liquids, but intensity of color may be increased by slightly heating. If product resulting from treating cotton is made up to 1 : 1,000, resorcin will give an orange color; alpha-naphtol a purple; gallic acid a green, gradually becoming violet down in the acid; hydroquinone of pyrogallol a brown; morphine or codeine lavender; thymol or menthol a pink. Cotton may be detected in colored goods, using bone-black to decolorize solut. if necessary.

Jansen (CARMINE BLUE). An acidified alcoholic solut. of Meister, Lucius, and Brüning's "bleu carmin aqueux."

Jassoy (MORPHINE). Shake suspected powder with 20 times its weight of cold water, filter, add iodic acid and then chloroform —the last is colored rose-red if morphine present.

Javelle, Eau de (POTASSIUM-HYPOCHLORITE SOLUTION). Dissolve 8 parts caustic potassa in 100 parts distilled water, and pass chlorine through to saturation, keeping the solution cool meanwhile with a mixture of ice and salt. Or, mix 20 parts chlorinated lime with 100 parts water and, after standing some time, add a solution of 15 parts of caustic potassa in 100 parts water. Filter after standing several hours and use filtrate. Should any lime be left in solution and form a pellicle of crystalline calcium carbonate, remove by adding a few drops of potassa solution and filtering off the ppt. formed.

Jaworowski (ALBUMIN AND PEPTONE IN URINE). Reagent is a solut. of ammonium molybdate and citric acid, 4, in water, 40. The urine is mixed with excess of soda and filtered, evaporated to one-third, shaken out with amyl alcohol, and neutralized with citric acid; on addition of reagent a precipitate forms if albumin or peptone present.

Jaworowski (ALKALOIDS). Dissolve 0.3 Gm. sodium vanadate in 10 Cc. warm distilled water; dissolve 0.3 Gm. cupric sulphate in 10 Cc. warm distilled water; mix the solutions, and add sufficient conc. acetic acid (7 to 8 drops) to dissolve ppt. of copper vanadate, and filter turbid liquid. In testing, sub-

stance is dissolved in 4 or 5 Cc. water (pure alkaloids with aid of a few drops dil. acetic acid), and solut. divided into two portions, one of which is treated with reagent in the cold, the other treated with reagent after being heated. According to the alkaloid under consideration, a ppt. will form in one of the solutions. Some are not pptd., however. For details see MERCK'S REPORT, V, p. 456.

Jaworowski (AMMONIA). Mercuric chloride, 1; sodium carbonate, 1; sodium chloride, 1; water, 30.

Jaworowski (CHLORAL-HYDRATE REACTIONS). 1.—Dissolve 0.12 Gm. resorcin in aqueous solut. chloral hydrate, and overlay solut. on dil. sulphuric acid—a few colored rings appear, a brown one being most distinct; on shaking, mixture turns brown, being clear at first, then turbid. On superstratifying with conc. ammonia, the upper alkaline stratum becomes yellowish-red. 2.—Nessler's solut. occasions in chloral-hydrate solutions a brick-red ppt. which gradually becomes brighter, and finally dirty yellowish-green. 3.—Add 0.3 Gm. potassium sulphocyanate to 2 Cc. chloral-hydrate solut. (containing about 0.03—0.06 Gm.), heat to boiling, then add 3 to 5 drops potassa solut.—mixture becomes light brown and deposits a dark-brown ppt.; on adding ammonia solut. turns light brown, but not turbid. 4.—Dissolve 0.02 or 0.03 Gm. sodium thiosulphate in 2 Cc. chloral-hydrate solut. (as before), and heat—liquid assumes a brick-red color and becomes turbid; on adding a few drops potassa solut., mixture becomes a clear brownish-red. 5.—Dissolve 0.06 to 0.12 Gm. phloroglucin in 3 to 4 Cc. hot dist. water, add 0.09 to 0.12 Gm. chloral hydrate, boil, then add 16 drops normal potassa solut.—a deep brownish-red develops. If cooled liquid is acidulated with HCl and shaken with amylic alcohol, latter becomes brown-red or deep brown. Chloroform yields under similar circumstances (phloroglucin being dissolved in hot 90-% alcohol) a dirty-brown color in 2 to 4 hours.

Jaworowski (CINCHONA ALKALOIDS). Freshly prepared mixture of equal parts 10-% sodium-thiosulphate solut. and 5-% copper-sulphate solut. Quinine, cinchonine, cinchonidine, and quinidine all give yellow amorphous ppts. with reagent.

Jaworowski (COPPER). Reagent prepared by adding 1 or 2 drops phenol to 5 Cc. ammonia water.

Jaworowski (GLUCOSE). Add 0.12 Gm. iodic acid and 0.2 to 0.4 Gm. caustic-soda solut. to 3 or 4 Cc. glucose solut. and boil for 1 minute. On cooling, acidulate with dil. HCl, and carefully overlay with ammonia—a dark ppt. of nitrogen iodide falls.

Jean (OILS). Syrupy phosphoric acid, saturated with hydrochloric acid gas, gives distinctive color reactions with various oils.

Jean-Alvarez (CHLORATES, CHLORIDES AND NITRATES). Ppt. liquid with silver acetate and filter off silver chloride. Acidulate filtrate with acetic acid, and heat with piece of zinc; by this means chlorates are reduced to chlorides and pptd. as silver chloride. The ppt. gradually disappears, however, because of its further reduction to metallic silver. A portion of it is therefore made alkaline with potassa, and treated with Nessler's solut.—a red ppt. indicates ammonia resulting from reduction of any nitrate that may have been present.

Jehn (PEPPERMINT OIL). Dark, cherry-red color develops on adding chloral hydrate, and changed to violet on further addition of sulphuric acid and chloroform.

Johannson (ALKALOIDS AND PROXIMATE PRINCIPLES). 1 Gm. ammonium vanadate dissolved in 100 Cc. conc. sulphuric acid gives characteristic reactions, as follows; *Aconitine*—light coffee-brown; *atropine*—red changing to yellowish-red and to red again; *apomorphine*—violet-blue changing rapidly to dirty-green, then to reddish-brown; *brucine*—intense blood-red, color fading then returning again; *cinch nine*—faint orange; *cocaine*—orange; *codeine*—greenish-brown to brown; *colchicine*—green, changing to brownish-green and coffee-brown; *coniine*—intense green, becoming brownish; *caffeine*—no reaction; *digitalin*—intense dark brown; *morphine*—brown; *narceine*—brown to brownish, dirty blue-violet, becoming red-brown; *narcotine*—intense blood-red; *papaverine*—violet, changing to dark reddish-violet, bluish-green, and orange-yellow; *picrotoxin*—intense yellowish-red—*pilocarpine*—light orange; *piperin*—intense red-brown to black-brown, particles being black; *physostigmine*—greenish-yellow changing to carmine-red and yellowish-brown; *quinidine*—

faint bluish-green; *quinine*—pale orange, then bluish-green to greenish-brown; *antifebrin*—carmine-red changing to brown; *antipyrine*—intense greenish-blue, becoming bluer; *kairin*—dirty rose-red changing to dirty light-brown and brownish-green; *santonin*—no reaction; *solanine*—coffee-brown, the edges of the drops becoming carmine-red, yellow towards the center, and dirty-green at the center. In 2 hours the drop is gelatinous and intensely dark-violet; *strychnine*—bluish-violet, changing to reddish-violet, carmine-red, and fiery red. When crystals are simply moistened with reagent a violet blue develops; *veratrine*—brownish-red changing to dark reddish-violet.

Johnson (ALBUMIN). See *Hager's* test for alkaloids.

Johnson (ARSENIC). Heat with soda and a strip of aluminium—arseniuretted hydrogen is evolved, detected by silver-nitrate paper.

Johnson (CEMENT FOR FIXING CELLOIDIN BLOCKS). Melt together 1 part beeswax and 2 parts resin. Drop a little on to the warmed object-holder, then press on to it the perfectly dry celloidin block, and allow to cool.

Johnson (PLATINUM HARDENING MIXTURE). Mix solutions of 2.5-% potassium bichromate, 70 parts; 2-% osmic acid, 10 parts; and 1-% platinic chloride, 15 parts, with 5 parts acetic or formic acid.

Johnson (SUGAR IN URINE). Heat diabetic urine with picric-acid and potassa solut.—a deep-red color appears. Author recommends the previous removal of uric and creatinine with mercuric chloride. From the filtrate obtained after a while, the excess of corrosive sublimate is precipitated with ammonia, and the solut. then tested with picric acid.

Joliet (IMBEDDING METHOD). Dissolve acacia in water to the consistency of a thick syrup, and add 6 to 10 drops glycerin to a watch-glassful. Immerse object, and leave to dry for 1 to 4 days, then cut out a block containing it and allow the other side to dry.

Jolles (ACETONE). Acetone is pptd. by phenylhydrazine.

Jolles (ALBUMIN IN URINE). Corrosive sublimate, 1 Gm.; succinic acid, 2 Gm.; sodium chloride, 1 Gm.; water, 50 Gm. To apply the test, 4.5 Cc. of the filtered urine are poured into

each of two test-tubes, 1 Cc. acetic acid added to each, and then the mixtures shaken up, in one case with 4 Cc. of reagent, in the other with 4 Cc. distilled water. By comparing the samples, traces of albumin (1:120,000) may be detected. See *Spiegler's* reagent.

Jolles (BILIARY PIGMENTS). Shake 50 Cc. urine for several minutes in a glass cylinder with a few drops 10-% HCl, 5 Cc. pure chloroform, and a satur. barium-chloride solut. After standing 10 minutes, the chloroform together with the ppt. is removed with a pipette, and the chloroform evaporated off in a test-tube on a water-bath at 80° C. On exposure to ordinary temperature for some time, the aqueous portion of the residue is decanted from the agglutinated precipitate. This latter is distinctly colored even when only 1% bile is present in the urine; on adding 3 drops conc. nitric acid containing one-third its volume fuming nitric acid, the characteristic green and blue rings are formed.

Jolles (IODINE IN URINE). Mix urine with an equal volume HCl and a few drops chlorine water—iodine, if present, causes a brown ring, becoming blue on adding starch solution.

Jolles (MERCURY IN URINE). Warm 100 Cc. urine with 2 Gm. granulated gold and some stannous chloride. After decanting the liquid, wash any amalgam that may be formed with water, and then introduce into a test-tube with a little water and an equal volume of freshly prepared stannous-chloride solut. The slightest traces of mercury may also be quantitatively estimated by heating the dried amalgam. See *Merget's* test.

Joly-Pacquelin (PYROPHOSPHORIC ACID IN URINE). On heating urine with conc. acids or alkalies, pyrophosphates are changed to orthophosphates, which are then pptd. by ammonium molybdate.

Jones (CHLORIDES, BROMIDES, AND IODIDES). Place substance in a large test-tube with a little manganese dioxide and water, and add 1 drop 10-% sulphuric acid—a brown color develops if iodine present and, on boiling, violet vapors are given off. When all iodine is removed by boiling, further addition of 2 Cc. of acid causes evolution of brown vapors on again boiling, if bromine be present. When all the bro-

mine removed by boiling, cool, add equal volume of acid and heat once more. Green vapors indicate chlorine.

Jorissen (AMYLIC ALCOHOL). 10 drops colorless aniline and 2 or 3 drops hydrochloric acid cause a red color in 10 Cc. alcohol if fusel oil present in quantity. Very small quantities of fusel oil must first be separated by shaking liquid with ether and evaporating ethereal layer before applying test. Reaction is not produced by the fusel oil contained in alcohol, but is due to the presence of furfurol, one of the fermentation by-products (*Forster*). If considerable quantities of furfurol are present, the liquid may be tested directly with a few drops of aniline and hydrochloric acid.

Jorissen (ALKALOIDS). 1 Gm. zinc chloride dissolved in 30 Gm. each of hydrochloric acid and water. Alkaloids evaporated to dryness with this solution give characteristic color reactions. See *Hager*, Pharm. Praxis, 1886, III, p. 1250.

Jorissen (APIOL). Add chlorine water to dilute alcoholic solut. of apiol until slight turbidity, then add a few drops NH_3—a handsome red color develops, which soon fades. Color very intense with pure apiol, but weak with adulterated apiol.

Jorissen (IODINE IN BROMINE). Boil with 30 Cc. saturated solut. potassium chlorate till colorless, cool, add a few drops morphine solution (1 Gm. dissolved in excess of dil. H_2SO_4 and water to make 100 Cc.) and a little chloroform—latter is colored violet if iodine present.

Jorissen (MINERAL ACIDS IN VINEGAR). A purple color develops on adding vinegar containing mineral acids to a mixture of 1 drop Gurjun oil and 25 drops glacial acetic acid.

Jorissen (MORPHINE). Heat morphine on a water-bath with a few drops conc. H_2SO_4 and a crystal ferrous sulphate, and pour resulting liquid into a few Cc. ammonia water—at point of contact a red color develops, soon changing to violet, while the ammonia solut. turns blue.

Jorissen (NITROUS ACID). Dissolve 0.01 Gm. fuchsine in 100 Cc. glacial acetic acid; on adding to 2 Cc. of this solution a trace of a nitrite, the color changes from violet to blue, then to dark green, yellowish-green, and reddish-yellow, and is finally entirely discharged.

Jorissen (SALICYLIC ACID IN PRESENCE OF CITRIC ACID). Mix 10 Cc. liquid with 4 drops 10-% solution potassium- or sodium nitrite, 4 drops of acetic acid, and 1 drop 10-% solution copper sulphate, and heat mixture to boiling-point—if salicylic acid present a blood-red color develops.

Joseph (INJECTION MASS). Dilute filtered white of egg with 1- to 5-% carmine solution. This mass remains liquid when cold, but coagulates when immersed in dilute nitric, chromic, or osmic acid.

Julius (BENZIDINE). A voluminous deep-blue ppt. forms on adding potassium bichromate to an aqueous solution.

Jungmann (ALKALOIDS). Upon treating the ppts. obtained with phosphomolybdic acid (see *Sonnenschein's* reagent) with ammonia, several are colored blue or green. See *Hager*, Pharm. Praxis, 1886, I, p. 203.

Jungmann (ARBUTIN). A blue color develops on making the solution alkaline and adding phosphomolybdic acid.

Just (IRON IN FERRUGINOUS NUCLEINS AND NUCLEO-ALBUMINS [HEMOGLOBIN, HEMATIN, etc.]). Add NH_3 to a strong solut. ammonium persulphate until decidedly alkaline, then add the ferruginous nuclein, and boil for 3 or 4 minutes. Make up NH_3 which escapes on boiling, and keep solut. alkaline. The solut. at first yellow, reddish-brown, or black, becomes colorless on boiling, ferric hydroxide in flocculent form separating. Test may be carried out qualitatively or quantitatively.

Kaatzer (TUBERCLE STAIN). Place cover-glass preparation in supersat. alcoh. solut. gentian violet for 24 hrs., or, if solut. is warmed to 80° C., for 3 minutes. Decolorize in solut. of 100 Cc. 90-% alcohol, 20 Cc. water, and 20 drops conc. HCl. Wash in 90-% alcohol. After-stain with conc. aqueous solut. vesuvine.

Kadyi (IMBEDDING MASS). Heat 25 Gm. sodium-stearate soap in shavings with 100 Cc. 96-% alcohol in a retort on a water-bath. When solution is complete, filter and cautiously add water in small quantities until a drop of solution, poured into a watch-glass, no longer solidifies into a white mass. About 5 to 10 Gm. water will be required for 120 Gm. soap solution.

The finished mass should be almost transparent, with merely the slightest blue opalescence.

Kaiser (BISMARCK-BROWN STAIN). Stain sections for 48 hours, at a temperature of 60° C., in a sat. solut. Bismarck brown in 60-% alcohol, and wash out in 60-% alcohol containing 2% HCl or 3% acetic acid.

Kaiser (GLYCERIN JELLY). Soak 1 part, by weight, of gelatin in 6 parts water for about 2 hours, then add 7 parts glycerin, and for every 100 Gm. of the mixture 1 Gm. strong carbolic acid. Warm 10 to 15 minutes, stirring until all the flakes produced by the carbolic acid have disappeared, then filter through wet glass-wool.

Kaiser (NERVE STAIN). Modification of Weigert's process. Harden material in Muller's solution for 2 or 3 days, then cut into slices 2 to 4 Mm. thick and treat with solution for 5 or 6 days more. Subsequently immerse in Marchi's solution for 8 days, then wash, pass through alcohol, and imbed in celloidin. Mordant sections for 5 minutes in the following mixture: Solution ferric chloride, 1 part; distilled water, 1 part; alcohol, 3 parts. Next wash in Weigert's hematoxylin, and warm in a fresh quantity of latter for a few minutes, wash with water, differentiate in Pal's solution, and neutralize oxalic acid by washing in water containing a little ammonia.

Kaiser (STAIN FOR SPINAL CORD). Stain sections for a few hours in a solution of naphtylamine brown, 1 part; water, 200 parts; and alcohol, 100 parts. Afterwards, wash with alcohol and clear with origanum oil.

Kaiser (WOOD CELLULOSE). The reagent is prepared by heating on a water-bath at about 95° C. a mixture of equal volumes of furfurol-free amylic alcohol and conc. H_2SO_4, until a slight evolution of gas ensues, and then cooling the light reddish-yellow mixture. The "amyl-sulphuric acid" so obtained possesses the property of coloring wood cellulose red, violet, or an intense indigo, according to the quantity present. For instance, on moistening a piece of newspaper, etc., with the reagent, a greenish color first develops, becoming later on a fine blue. Pure Swedish filtering paper acquires only a red color; poor qualities, a violet. The reaction is facilitated by

blowing a current of air upon the moistened spot, or by lightly warming. On washing with water the colors become lighter in color. The color reactions are due to the furol readily resulting from the action of amyl-sulphuric acid upon the wood-gum or xylose, from which the furol is formed by the simple splitting off of the elements of water.

Kaiserling (PRESERVATION OF SPECIMENS). To preserve natural color of specimens immerse latter for 3 to 5 days in a mixture of 200 Cc. formaldehyde, 1,000 Cc. water; 15 Gm. potassium nitrate, and 30 Gm. potassium acetate. Then remove and, after draining, place in 80-% alcohol for 6 hours, followed by 95-% alcohol for 2 hours, and permanently preserve in a dark place, in a mixture of 2,000 Cc. water, 200 potassium acetate, and 400 glycerin.

Kalbrunner (MORPHINE). A blue color forms on adding 5 or 6 drops 1:8 aqueous ferric-chloride solution followed by 3 or 4 drops 1:120 potassium-ferricyanide solution.

Kallins (NEUROLOGICAL METHOD). Hydroquinone, 5 Gm.; sodium sulphite, 40 Gm.; potassium carbonate, 75 Gm.; distilled water, 25 Cm. At time of using, dilute solut. with one-third to one-half its bulk absolute alcohol, and immerse sections of silvered material for several minutes until reduction complete. Then place them in 70-% alcohol for 10 to 15 minutes, and subsequently leave in 1:5 aqueous solution sodium thiosulphate for 24 hours or more. Finally, dehydrate and mount. Carmine may be used as an after-stain

Kammerer (NITROUS AND NITRIC ACIDS). A blue color on adding potassium iodide, starch paste, and acetic acid indicates nitrous acid; if blue color only produced on replacing the acetic acid with sulphuric acid and zinc dust, it indicates nitric acid.

Karle. See *Wiederholt.*

Kassner (HYDROGEN DIOXIDE). Upon adding potassium ferricyanide and some caustic-potassa solution, oxygen is evolved.

Kastenbine (BLOOD STAINS). Moisten spot with water, and apply a piece of white blotting paper, with pressure; then touch spot on blotting paper with tincture guaiac and hydrogen dioxide—spot becomes deep blue if blood was present.

Kauder (GLOBULIN). See *Pohl's* test.

Kayser (SACCHARIN). Shake out substance to be tested with a mixture of ether and benzin, evaporate ethereal extract, and test residue for sweetness.

Keiser (MICRO-PRESERVATIVE SOLUTION). Corrosive sublimate, 50 Gm.; water, 300 Gm.; acetic acid, 3 Gm.

Keiser (SUBLIMATE SOLUTION). Mercuric chloride, 10 Gm.; glacial acetic acid, 3 Gm.; distilled water, 300 Gm.

Keller (CORNUTINE). Dissolve ergotin 0.5 Cc. in 0.5 Cc. water, and after adding one drop ammonia shake out with 1 Cc. ether; dissolve residue left on evaporating ethereal layer in 1.5 Gm. acetic acid containing a trace ferric chloride. Overlay solution on a little conc. H_2SO_4 in a test-tube; cornutine gives a bright bluish-violet color reaction at zone of contact.

Keller (DIGITALIS PRINCIPLES). Dissolve substance in 3 to 4 Cc. glacial acetic acid, add a drop diluted ferric-chloride solut. and overlay on conc. H_2SO_4—*digitonin* yields a rose-red, rapidly-fading zone; *digitalin* a permanent, carmine-red zone; *digitalein* a rapidly-fading red zone; *digitoxin* first yields a dirty, brownish-green zone, then the upper portion of the sulphuric acid is colored brownish-red, and above this a bluish-green band forms.

Keller (ERGOTININE IN ERGOT). Shake powd. ergot with ether, let stand 15 minutes, and filter; to filtrate add about 10 drops hydrochlorated ether (5 Cc. conc. HCl and 100 Cc. ether shaken together and decanted)—ergotinine hydrochlorate is pptd. as yellow flakes. Collect ppt. on filter, wash with ether, and dissolve in 2 Cc. glacial acetic acid; overlay solut. on conc. H_2SO_4 and add a very little ferric-chloride solut.—a blue color develops.

Keller-Kiliani (DIGITALIS). Overlay a preparation of digitalis made with acetic acid and containing ferrous sulphate on H_2SO_4, also containing ferrous sulphate—a reddish-violet develops.

Kern (GOLD). A reddish-orange color and ppt. form on adding 1 drop gold-chloride solut. to a large excess of potassium-sulphocyanate solut.

Kern (URANIUM). A brown ppt. soluble in HCl forms on adding potassium-ferrocyanide solut.; the acid solut. turns green on boiling with a few drops HNO_3.

Kerner (CREATIN AND CREATININE). Creatinine is pptd. from acid solutions by phosphotungstic or phosphomolybdic acid; a crystalline ppt. is obtained from even very dilute solutions. The compound of creatin with the acids, however, is soluble, and may be obtained in crystalline form.

Kerner (QUININE). Quinine sulphate is much more difficultly soluble in water than are the sulphates of the allied alkaloids. If therefore quinine sulphate (or any other quinine salt after addition of sodium sulphate) is shaken with a definite quantity of water, the volume of ammonia required to produce a permanent precipitate in the filtrate will be a measure of the percentage of allied alkaloids present. Digest 2 Gm. pure quinine sulphate in 20 Cc. water at 60° to 65° C. for ½ an hour, and allow to stand for 2 hours at 15° C., occasionally shaking, and then filter through glass-wool; 5 Cc. of the filtrate require 4 to 4.3 Cc. of 10-% ammonia. In the presence of cinchonine, quinidine, etc., more ammonia is necessary.

Kerner (QUININE IN URINE). Test depends on fluorescence of quinine solutions. Since this is prevented by sodium chloride, a conc. mercurous-chloride solut. is added to the urine until a ppt. is no longer produced. On filtering, appreciable quantities of quinine indicated by fluorescence, and more easily so by the use of a fluoroscope.

Kerstal (TELLURIUM). A violet color develops on shaking powdered ore containing tellurium with a little water and mercury, and then adding a little sodium amalgam.

Kersting (NITRIC ACID). A few drops solut. of brucine in sulphuric acid causes a brilliant red to yellowish-green color.

Keutmann (SALOPHEN). Moisten 0.2 Gm. salophen with few drops nitrosylsulphuric acid (5 Gm. potassium nitrite and 100 Gm. sulphuric acid)—the mass immediately becomes reddish-brown. On adding a few Cc. alcohol, color disappears; excess of alkali now added causes a yellow color, dissipated by excess of acid.

Kieffer (FREE MINERAL ACIDS). Cautiously treat copper-sulphate solut. with ammonia until ppt. is just redissolved. Solutions of neutral metallic salts that show an acid reaction toward litmus produce a turbidity with this reagent; if, however, the salts contain free acids, the mixture remains clear.

Kieffer (MORPHINE). On mixing 5 or 6 drops of a 1:8 ferric-chloride solut. and 3 drops of a 1:100 potassium-ferricyanide solut., a drop of morphine solut. will cause a blue color or precipitate (reduction of the ferricyanide).

Kintschgen-Gintl. See *Millon's* reagent.

Kippenberger (ALKALOIDS). Iodine, 12.7 Gm.; potassium iodide, 60 Gm.; water, one liter. The alkaloid may be liberated from the ppt. by dissolving the iodine compound in a little acetone, saturating first with alkali, then with acid, diluting with water and driving off acetone with heat; addition of a little thiosulphate solut. removes any traces of free iodine; the solut. is then made alkaline with sodium carbonate, and shaken out with ether or chloroform. Glucosides give no ppts. with this reagent.

Kirkby (ALKALINE GLYCERIN MOUNTANT). A mixture of glycerin, 4; distilled water, 3; and solut. of potassa, B.P., 1, makes a serviceable extemporaneous mountant for plant sections. It combines the refringent property of the glycerin with the clearing action of the caustic potassa, and the swelling action of the latter is considerably restrained.

Kirkby (CLEARING SECTIONS). Place sections in a fresh, clear solut. chlorinated lime until quite bleached (2 to 5 minutes), then gently warm in a test-tube for a few seconds, and afterwards quickly replace solut. with distilled water and boil for 2 or 3 minutes. Repeat the treatment with boiling water three times, after which wash with 1-% acetic acid and finally with cold distilled water. Staining can then be performed.

Kitasato-Salkowski (INDOL IN BACTERIAL CULTURES). Potassium-nitrate solut. (1:5,000), 1 Cc. and a little H_2SO_4 are added to 10 Cc. of the culture broth. Indol is indicated by the formation of a red color. If the color reaction is given on adding H_2SO_4 alone, it indicates presence of both indol and nitrites (red cholera reaction).

Kitton (ASPHALT VARNISH). Dissolve asphalt in benzene and add a little gold size.

Kitton (WHITE-LEAD CEMENT). Grind together equal parts powdered white lead, red lead, and litharge with a little turpentine, and when thoroughly incorporated, mix with gold

size. Keep a stock of the materials ready ground, and mix as required for use.

Kjeldahl (DETERMINING NITROGEN). Weigh 0.5 to 2 Gm. of the substance and boil with 20 Cc. H_2SO_4 and 0.7 Gm. mercuric oxide for 10 minutes, then add 10 Gm. potassium sulphate, and continue boiling until solut. is a pale straw color. Cool, wash into a distilling flask with 200 Cc. water, and rinse out acid flask with two more successive lots of water. Add 75 Cc. of 50-% sodium-hydrate solut. and 10 Cc. potassium-sulphide solut., distil into 50 Cc. decinormal H_2SO_4, using cochineal as indicator. When all the ammonia has distilled over, titrate the uncombined acid. Each Cc. decinormal H_2SO_4 used = 0.0014 N, = 0.0017 NH_3, = 0.00886 albuminoids. In many cases the mercuric oxide is not necessary, and in that case the potassium sulphide is omitted.

Kleb (GLYCERIN GELATIN). Wash 10 parts best French gelatin and allow to stand in distilled water till it swells up; then pour off excess of water, melt at a gentle heat, and add 10 parts glycerin and 2% carbolic acid.

Kleb (GLYCERIN JELLY). Mix a conc. solut. isinglass with half its volume glycerin.

Klein (COCHINEAL FLUID). See *Csokor's* alum cochineal.

Klein (FIXING MIXTURE). Mix 2 parts 1:600 chromic-acid solut. with 1 part methylated spirit. Or, mix 1 Cc. 10-% chromic-acid solut. with 60 Cc. water, and add 30 Cc. 90-% alcohol.

Klein (MINERALS). For mechanical separation of constituents of a powdered mineral, an aqueous solut. cadmium borotungstate, sp. gr. 3.3, is used. See *Thoulet's* solution.

Kleinenberg (COLOPHONY). A solut. of ordinary pale resin in rectified oil turpentine.

Kleinenberg (HEMATOXYLIN). Great differences exist in the formulas for this stain. According to Squire, 20 Gm. of crystallized calcium chloride should be dissolved in 10 Cc. distilled water, and 3 Gm. alum in 16 Cc. distilled water, by the aid of heat. Mix solutions and immediately dilute with 240 Cc. rectified spirit; filter after standing an hour, and add 2.5 Gm. hematoxylin.

Kleinenberg (PICRO-SULPHURIC ACID). 1.—Distilled water, 100 volumes; H_2SO_4 2 volumes; dissolve in the mixture 0.25% picric acid. Dilute finished solution with three times its volume water. 2.—20 Cc. of saturated solut. picric acid, 380 Cc. distilled water, and 2 Cc. H_2SO_4. 3.—Picric acid, 1 Gm.; water, 100 C.; sulphuric acid, 6 Cc.

Klemperer (ZYMOGEN OF RENNET). To 2 Cc. filtered gastric juice add 10 Cc. milk, 2 Cc. 3-% solut. calcium chloride, and an excess of 1-% solut. sodium carbonate, then place mixture in incubator—milk is coagulated.

Klett (INDICAN IN URINE). Add 5 Cc. 25-% HCl and a crystal of ammonium persulphate to 10 Cc. urine, and shake whole with a little chloroform—latter is colored blue if any indican is present.

Kletzinski (QUININE). Add to a sat. solut. potassium ferricyanide five times its volume sat. potassium-chloride solut., make the blackish-green liquid strongly alkaline with ammonia, and filter. A blood-red to violet color is produced on adding an excess chlorine water to a liquid containing quinine, and then adding the above reagent.

Klunge (BERBERINE). A red color forms on adding chlorine water to an aqueous solut. acidified with HCl or H_2SO_4.

Klunge (CUPRALOIN REACTION). A very dilute solut. of aloes is colored yellow on adding copper sulphate. On adding sodium chloride and gently warming, a red color results. On adding alcohol in addition to sodium chloride, color is produced at ordinary temperature.

Klunge (PHENOL). A blue color develops on adding a few drops of oxaniline solution, followed by a little ammonia.

Knapp (GLUCOSE). Solut. of 10 Gm. mercuric cyanide and 100 Cc. soda-lye (sp. gr. 1.45) in enough water to make a liter. This solut. is reduced upon warming with glucose, metallic mercury precipitating. Creatin and creatinine act similarly. 40 Cc. solut. correspond to 0.1 Gm. glucose.

Knauer (SLIDE-CLEANING PROCESS). Boil for 20 or 30 minutes in 10-% lysol solution, then rinse with water till clear.

Knop (NITROGEN ESTIMATION). Reagent for estimation of nitrogen in ammonium salts and in amides by means of the azotometer is sodium hypobromite. See *Huefner's* test.

Kobell (BISMUTH). A scarlet-red color develops when bismuth, mixed with an equal weight potassium iodide and a little sulphur, is heated on charcoal in the blow-pipe flame.

Kobell (MOLYBDIC ACID). A blue color forms on heating with H_2SO_4 and adding alcohol.

Kobert (HEMOGLOBIN). Solutions containing hemoglobin give a ppt. of zinc-hemoglobin on being shaken with zinc dust, or mixed with soluble zinc salts. The ppt. is colored red by alkalies.

Kobert (MORPHINE, DIONIN, CODEINE, HEROIN, AND PERONIN). Treat substance with recently prepared formaldehyde-sulphuric acid (2 or 3 drops formaldehyde and 3 Cc. sulphuric acid). Reactions are as follows: *Morphine*—an immediate purple-red changing to violet, bluish-violet, then pure blue; *dionin*—immediate deep-blue, unchanged; *codeine*—reddish-violet, then bluish-violet; *heroin*—reddish-violet at first, then rapidly bluish-violet; *peronin*—reddish-violet persistent for many hours.

Koch (ANILINE WATER). See *Ehrlich-Weigert-Koch's* test.

Koch (BACTERIA STAIN). Place for 5 minutes in a solut. of K_2CO_3 (prepared by mixing a sat. solut. of the salt with an equal quantity distilled water). Then dehydrate in alcohol, place in cedar-oil, and finally mount in balsam.

Koch (CHOLERA REACTION). The addition of H_2SO_4 to cholera cultures (on peptone) causes a red coloration, due to action of the acid on the two decomposition products of the cholera bacillus, indol and nitrous acid.

Koch (COPAL METHOD). Stain small pieces of material in bulk and dehydrate with alcohol, then immerse in a thin solut. of copal in chloroform. Evaporate with a gentle heat until the solut. is so far concentrated as to draw out into threads that are brittle on cooling. Then remove objects and leave on a tile for a few days to dry. Sections may then be cut by means of a fine saw. If objects are imbedded unstained, remove copal from sections by soaking in chloroform, decalcify if necessary, and then stain.

Koch (METHYL-VIOLET SOLUTION). Solut. for staining bacteria is made by adding a few drops conc. methyl-violet solut. in absolute alcohol, to 20 Gm. distilled water.

Koch (STAINING FLAGELLA). Immerse cover-glass preparations in a 1-% aqueous solut. hematoxylin, then transfer to a 5-% solut. chromic acid or to Müller's fluid; dry and mount in balsam.

Koch (METHOD FOR TUBERCLE BACILLI). Place sections or cover-glass preparations in Koch's methylene-blue solut. for 20 to 24 hours (or 0.5 to 1 hour if warmed to 40 C.), then treat with aqueous solut. vesuvine for 2 minutes, and wash out excess of color with distilled water. Cover-glass preparations should then be dried and mounted in balsam, whilst sections require to be dehydrated in absolute alcohol and cleared in cedar oil before mounting in balsam.

Koch (METHYLENE-BLUE SOLUTION). 1 Cc. sat. alcoholic solut. methylene blue; 0.2 Cc. 10-% caustic potassa solut.; 200 Cc. distilled water.

Koch (TUBERCLE BACILLI STAIN). 2 Cc. aniline are shaken with 20 Cc. water and the mixture filtered through a wetted filter. To the clear filtrate, alcoholic fuchsine- (or gentian-violet) solut. is added until a film having a metallic luster indicates saturation.

Koch-Ehrlich (STAINING METHOD). Place sections or cover-glass preparations for at least 12 hours in gentian-violet or fuchsine aniline water (aniline water, 100 Cc.; conc. alcoholic solut. gentian violet or fuchsine, 11 Cc.; absolute alcohol, 10 Cc.), then immerse in a mixture of pure HNO_3 (sp. gr. 1.42), 10 Cc., and distilled water, 30 Cc., for some seconds. Rinse in 60-% alcohol for a few minutes, and then counter-stain with vesuvine (vesuvine, 0.5 Gm.; rectified spirit, 20 Cc.; distilled water, 80 Cc.) after gentian violet, or methylene blue (methylene blue, 0.25 Gm.; rectified spirit, 20 Cc.; distilled water, 80 Cc.) after fuchsine. Finally rinse in water, dehydrate, clear, and mount in balsam. According to *Squire*, who points out that nitric acid is apt to injure delicate sections, *Watson Cheyne* recommends that sections be transferred from fuchsine-aniline water to distilled water, then rinsed in alcohol, and placed in the following contrast stain for 1 to 2 hours: Sat. alcoholic solut. methylene blue, 20 Cc.; distilled water, 100 Cc.; formic acid (sp. gr. 1.2), 1 Cc.

Koch-Ehrlich (TUBERCLE STAIN). Dry and fix cover-glass preparations in air, stain for 12 hours in Weigert-Koch aniline-water aniline-stain solut., then dip for 1 to 3 seconds in weak H_2SO_4 (1 : 3 or 4), and at once agitate in 60-% alcohol. After-stain in aqueous solut. vesuvine or methylene blue for several minutes.

Koettstorfer (IODINE). On adding carbon disulphide, acidifying with diluted H_2SO_4 and passing vapors of fuming nitric acid through the solut., a rose-red to violet color develops.

Koettstorfer (NUMBER). This indicates the caustic potassa, in milligrammes, required to completely saponify one gramme of a fat.

Kohler (ALKALOIDS). Distinctive color reactions are afforded on mixing alkaloids with 3 to 5 times their weight of potassium nitrate, then adding 1 or 2 drops H_2SO_4 and sodium-hydrate solution. See *Langley's* test.

Kolisch (CREATININE). Precipitant consists of mercuric chloride, 30; sodium acetate, 1; absolute alcohol, 125 Gm.; acetic acid, 3 drops.

Kollmann (FIXING SOLUTION). This contains 5% potassium bichromate, 2% chromic acid, and 2% conc. HNO_3.

Kolossow (GOLD METHOD). Impregnate objects for 2 or 3 hours with a 1-% solut. gold chloride acidulated with 1% HCl; subsequently reduce for 2 or 3 days, in the dark, in a 0.01- to 0.02-% solut. chromic acid.

Kolossow (OSMIUM STAINS). 1.—A 0.5-% solut. osmium in a 2- or 3-% solut. uranium nitrate or acetate. 2.—Absolute alcohol, 50 Cc.; distilled water, 50 Cc.; conc. nitric acid, 2 Cc.; osmium, 1 to 2 Gm. Keep in a cool place. Partly reduced solutions may be regenerated by the addition of a little powdered potassa alum.

Kolter (HYPOCHLOROUS ACID). On shaking the liquid to be tested with metallic mercury, brown oxychloride of mercury forms in the presence of this acid.

Koninck, De- (POTASSIUM). A yellow ppt. forms on adding a 10-% solut. sodium nitrite mixed with cobalt chloride and acetic acid.

Kopp (LEAD IN TIN-FOIL). A drop of H_2SO_4 is applied to the foil; if pure tin, the spot remains white. If lead present, a black stain is produced.

Kopp (NITRIC ACID). Add a little conc. H_2SO_4 to a few crystals of diphenylamine, and then a little water; finally dilute solution with more conc. H_2SO_4. 0.5 Gm. of reagent is put on a watch glass, and a drop of the fluid to be examined is allowed to fall in the middle—the presence of HNO_3 is indicated by the appearance of a blue circle; numerous other bodies, such as sulphurous acid, hypochlorites, and ferrous salts, give a similar color. Diphenylamine-sulphate solution is also known as *Pollet's* reagent.

Kopp (NITROUS ACID). A blue color forms on adding diphenylamine dissolved in H_2SO_4.

Kopp (OLIVE OIL). This is the "elaidin" test, 1 volume of HNO_3 and a piece of copper wire being heated with 10 volumes of the oil.

Kopsch (FORMALDEHYDE SOLUTION). Mix 4 parts 3.5-% bichromate solution and 1 part of commercial formaldehyde solution.

Korotneff (NARCOTIZATION METHOD). When Siphonophora are extended in water, a watch-glass containing chloroform is floated on the surface, and as soon as the animals are rendered insensible they are killed by means of hot mercuric choride or chromic-acid solut.

Kossel (HYPOXANTHIIN). Solution to be examined is treated with zinc and HCl, then made alkaline; hypoxanthin is indicated by a ruby-red color, changing to brown.

Kossinski (DOUBLE STAINS). 1.—Stain sections for 10 to 20 minutes in sat. aqueous solut. indigo carmine, wash with water, then with alcohol; next stain with 0.5-% solut. safranine in dilute alcohol, dehydrate and mount. 2.—Stain for 3 to 5 minutes in 0.1-% aqueous solut. nigrosin, and proceed as before.

Kost (FREE HYDROCHLORIC ACID IN GASTRIC JUICE). 10-% solut. tannin and solut. methyl violet are added to gastric juice—color changes from violet to blue or green. Modification of *Maly's* test.

Kotzebue (MORPHINE AND THALLINE). A 10-% solut. phosphomolybdic acid in ammonia-free water. 2 drops reagent yield with morphine (1 part in 1,000,000 even) a delicate, yellowish-white ppt. On adding 30 min. strong ammonia a decided blue color develops, best seen by looking down liquid against white paper. Thalline behaves similarly, but reaction still more delicate (1 : 2,000,000 almost).

Kowarsky (SUGAR IN URINE). Shake together 5 drops pure phenylhydrazine, 10 drops glacial acetic acid, and 1 Cc. satur. sodium-chloride solut., then add 3 Cc. urine, and heat 2 minutes, then allow to cool slowly—if more than 0.5-% sugar present, ppt. of glucosazone forms in about 2 minutes. Small quantity of albumin does not interfere with reaction.

Kraemer (ACETONE). See *Messinger's* test.

Krant (ALKALOIDS). See *Dragendorff's* test.

Krasser (ALBUMIN). Alcoholic solut. alloxan gives a bright-red color with albumin.

Krehbiel (BILIARY PIGMENTS). Mix urine to be tested with one-fourth its volume HCl and add chlorinated-lime solut. drop by drop—in the presence of biliary pigments a green color forms. Bromine water gives similar reactions. This is also known as *Trousseau-Dumontpallier's* reaction.

Kremers-Schreiner (CEDAR-WOOD OIL IN SPEARMINT OIL). Treat oil with hydroxylamine, expel volatile matter with steam, and dry and weigh the carvoxime formed, from which determine carvone percentage present in oil (should be 56% for pure oil).

Kronecker (ARTIFICIAL SERUM). Dissolve 6 Gm. of common salt and 0.06 Gm. caustic soda in 1000 Gm. distilled water.

Kronig (CEMENT). Gradually add ordinary resin, 7 to 9 parts, to melted beeswax, 2 parts, then filter and cool.

Kroupa (AMMONIA). Filter-paper dried after immersion in yellow solut. of fuchsine in acidulated water becomes red when exposed to ammoniacal vapor.

Krueger (GLUCOSE). See *Boettger's* test.

Krüger (INDICATOR). Fluorescein. Gives with alkalies a green fluorescence, discharged by acids.

Krutwig (SILVER IN LEAD ORE). Dissolve ore in HNO_3, add excess of soda, and examine gold-colored ppt. for silver.

Kubel (COLCHICINE). Dissolve substance in conc. HNO_3, and add water to brownish-violet solut.—color changes to yellow; on now making alkaline with potassa, an orange-yellow or orange-red develops.

Kubli (CARBON-DIOXIDE TEST FOR QUININE). Quinine is pptd. from a sat. solut. by sodium carbonate. Ppt. is dissolved on addition of sodium bicarbonate. Carbonic acid gas is then introduced, and quinine carbonate precipitated. Carefully conducted, the result indicates purity of the quinine salt under examination.

Kubli (WATER TEST FOR QUININE). Test is based on solubility of hydrated quinine, obtained by precipitating alkaloid with soda and observing quantity of water necessary to dissolve alkaloid pptd. The associated cinchona alkaloids are less soluble in water than quinine, consequently in their presence more solvent is required to produce a solution.

Kuborne (ATROPINE: COCAINE). Treat substance in a porcelain evaporating dish with few drops HNO_3, and evaporate to dryness on sand-bath. The cooled residue when heated on sand-bath with few drops solut. potassa in ethylic or preferably amylic alcohol, develops a fine violet color with cocaine; with atropine the color develops in the cold.

Kuehne (ANILINE- AND CLOVE-OIL STAINS). Rub up as much methylene blue, safranine, methyl green, auramine, acid violet, or fluorescin, as will be held on the point of a knife-blade, with 10 Gm. clarified aniline, or with 15 Gm. clove oil. If not entirely dissolved, pour unfiltered into a flask and allow to settle. Remove several drops of clear liquid, and add to sufficient pure oil or aniline to yield the concentration desired.

Kuehne (ANILINE SOLUTIONS). Rub up as much methylene blue, methyl green, or safranine as will go upon the point of a knife, with 10 Cc. aniline, and allow to settle.

Kuehne (ANISEED-OIL FREEZING MASS). Soak objects in aniseed oil for 12 to 24 hours, freeze and cut, then remove the oil with alcohol.

Kuehne (BACTERIA STAIN: DRY METHOD). Stain in 1-% aq. solut. ammonium carbonate to which has been added aq. solut. methylene blue, for 10 to 15 min. Rinse in water, decolorize in 1- to 2-% HCl, wash in water, dry on object-glass

by a current of air produced by a bellows, treat with xylene, and mount in balsam.

Kuehne (CARBOLIC FUCHSINE OR BLACK-BROWN). Dissolve 1 Gm. fuchsine or black-brown in 10 Cc. absolute alcohol, and add 100 Cc. 5-% aqueous solut. carbolic acid.

Kuehne (CARBOLIC METHYLENE BLUE). Rub 1.5 Gm. methylene blue with 10 Cc. absolute alcohol, and add 100 Cc. 5-% aqueous solut. carbolic acid.

Kuehne (CARBOL-METHYLENE-BLUE BACTERIA STAIN). Stain in carbol-methylene blue ½ to 2 hrs., rinse in water, extract in acidulated water (10 drops HCl and 100 drops water). Rinse in weak aq. solut. lithium carbonate (10 drops water and 6 to 8 drops sat. solut. lithium carbonate), then in pure water; dip in absolute alcohol containing a small quantity methylene blue, then in methylene-blue aniline a few minutes. Clear in pure aniline, then in oil cloves 2 minutes. Extract oil with xylene, and mount in balsam.

Kuehne (FLUORESCIN-OIL-CLOVE BACTERIA STAIN). Soak sections in conc. aq. solut. oxalic acid 5 to 10 minutes, rinse in water, and dehydrate in alcohol. Stain in fuchsine-aniline water or methylene-blue in 0.5- to 1-% aq. solut. ammonium carbonate. Dehydrate in alcohol containing small quantity of fuchsine or methylene blue, for 5 to 10 minutes. Then treat with ethereal oil, then with xylene, and finally mount in balsam.

Kuehne (FUCHSINE BACTERIA STAIN). Stain in carbol-fuchsine 3 to 5 minutes Rinse in water, and dip in alcohol. To differentiate and decolorize, place in methylene-green aniline from 15 minutes to 2 hrs., according to thickness of section. Then treat with an ethereal oil, then with xylene, and mount in balsam.

Kuehne (IODINE-POTASSIUM IODIDE). Iodine, 2 Gm.; potassium iodide, 4 Gm.; distilled water, 100 Gm.

Kuehne (MACERATING MIXTURE). Mix potassium chlorate with 4 times its quantity of HNO_3.

Kuehne (METHOD FOR BACTERIA). Sections are dehyhrated in alcohol, stained for 3 to 5 minutes with Kuehne's carbolic fuchsine, rinsed in water, dipped for 1 minute into alcohol, and extracted in Kuehne's methyl-green aniline, then passed through terebene and xylene. Anthrax sections are stained for 5 minutes in carbolic black-brown, rinsed in a mixture of

aqueous solution of lithium carbonate 1 Cc., and water 30 Cc., and then in 90-% alcohol. Afterwards place for 5 minutes in carbolic fuchsine, and decolorize in solut. yellow fluorescine, 1 Gm., in absolute alcohol, 50 Cc. Tubercle sections are treated for 10 minutes with carbolic fuchsine, thoroughly rinsed in water, decolorized in fluorescine alcohol, and then transferred to terebene, xylene, and balsam. Or, before mounting, they may be counter-stained by treatment for 5 or 10 minutes with methyl-green aniline diluted with half its bulk of aniline; then pass into terebene for 2 minutes, afterwards into xylene, and in balsam.

Kuehne (METHYL-VIOLET SOLUTION). Dissolve 1 Gm. methyl-violet in 90 Cc. distilled water and 100 Cc. alcohol.

Kuehne (METHYLENE-BLUE METHOD). Transfer sections from alcohol to carbolic methylene blue, and leave for half an hour, then rinse in water, and place in weakly acidulated water until of a pale-blue color. Next rinse in a mixture of sat. aqueous solut. lithium carbonate 1 Cc. and water 30 Cc., and transfer to pure water. Afterwards dip one by one into absolute alcohol in which some methylene blue has been dissolved, then transfer to Kuehne's aniline solution of methylene blue to dehydrate, rinse in aniline, clear in terebene, then in xylene, and mount in balsam. To show satisfactorily the structure of the tissue, Kuehne decolorizes sections stained in carbolic methylene blue with a solut. acetine- or chlorhydrin blue, 10 Gm., in 100 Cc. of 10-% alcohol. This takes 10 to 60 minutes. They are then passed through alcohol, aniline, terebene, and xylene, after which they are double-stained by treatment for 2 to 10 minutes with Kuehne's safranine aniline diluted to 4 or 5 times its bulk with aniline. Again pass through terebene and xylene before mounting.

Kuehne (MODIFIED GRAM'S METHOD). Stain nuclei with carmine, then treat sections for 5 minutes in methyl-violet solut. diluted one-sixth with a 1-% aqueous solut. ammonium carbonate, or in a solut. Victoria blue, 0.25 Gm., in alcohol, 20 Cc., and distilled water, 80 Cc. Next rinse thoroughly in water and transfer to Gram's solut. for 2 to 3 minutes; again rinse in water and extract excess of stain with solut. yellow fluorescine, 1 Gm., in absolute alcohol, 50 Cc. Finally, pass through

pure alcohol, aniline, terebene, and xylene, and mount in balsam.

Kuehne (STAIN FOR TYPHOID AND CHOLERA BACILLUS). A cold saturated solution of methylene blue is mixed with 1-% solution of ammonium carbonate. Preparations are immersed in the stain for 5 or 10 minutes, then well washed and placed in 1-% HCl.

Kuehne (SYNTONIN). Dissolve substance in lime water, and boil—partial coagulation ensues (other acid-albumins and alkali-albumins remain in solution).

Kuehne (TUBERCLE DOUBLE STAIN). *a.*—Stain in carbolic-fuchsine 10 minutes, decolorize in 30-% HNO_3, extract in 60-% alcohol until section is pink in color, wash in water, dehydrate in absol. alcohol 30 min., place for 5 to 10 min. in methylene-green aniline diluted with an equal vol. aniline, then in ethereal oil 2 min., and in xylene, then mount in Canada balsam. *b.*—Stain in carbol-fuchsine 10 min., rinse in water, extract in fluorescin-alcohol a few minutes, double-stain in methylene-green aniline 5 min., place in ethereal oil, then in xylene, and then mount in Canada balsam.

Kuehne (TUBERCLE TRIPLE STAIN). *a.*—Weakly stain in Delafield's hematoxylin solut., wash in water several seconds, dehydrate in alcohol, stain in carbol fuchsine 10 min.; rinse in water, extract fuchsine in fluorescine alcohol, rinse in pure alcohol, place in ethereal oil and in xylene, then in auramine-aniline until stained yellowish; rinse in pure aniline, then treat with ethereal oil and xylene, and mount in Canada balsam. *b.*—Stain section in nucleus black diluted 3 or 4 times with water, for several minutes, till section is dark gravish. Rinse in a weak aq. solut. lithium carbonate till section is light-gray, rinse in water, dehydrate in alcohol 5 min., stain in carbol-fuchsine 10 min., wash in water, extract in fluorescine-alcohol, wash in pure alcohol, place in methylene-green aniline (not too conc.) for 5 to 10 minutes, then in ethereal oil and in xylene, and mount in balsam.

Bacillus, red; nuclei, vessels, and protoplasm, of different tones of bluish-green.

Kuelz (BILIARY ACIDS). Add 1 drop very dilute solut. cane sugar to biliary acid, then 1 drop conc. H_2SO_4—a violet color develops; color developed more rapidly by heat.

Kuelz (SULPHOCYANIC ACID IN URINE). Add water to dilute solut. ferric chloride containing a little HCl, until same color as urine, then add to urine—a red color develops.

Kühl (KOUSSO FLOWERS). On adding to the weak aqueous maceration of the finely powdered kousso flowers, a 1:1,000 alkali solution, such as ammonia, or caustic soda, or potassa, an intense lemon- to orange-colored filtrate is obtained. This reaction is distinctly visible even in a maceration of 1:2,000.

Kühl (POMEGRANATE-ROOT BARK). In a 125-Cc. container, pour 100 Gm. distilled water over 0.1 Gm. finely powdered pomegranate-root bark. After shaking, the powder is pptd. within a very short time, while in the case of kousso flowers, complete separation does not take place, even after standing 12 hours. After macerating for 12 hours, at 10 to 15° C. and filtering, a slightly-yellow filtrate is obtained. On adding to this NH_3, a very intense yellow is developed, which grows deeper, and finally changes to a reddish-brown color.

Kultschitzky (DOUBLE IMBEDDING METHOD). After the collodion bath, soak objects in origanum oil, then pass into a mixture of origanum oil and paraffin heated to not more than 40° C., and finally soak in pure paraffin.

Kultschitzky (FIXING SOLUTION). A sat. solut. potassium bichromate and copper sulphate in 50-% alcohol, to each 100 Cc. of which 5 or 6 drops acetic acid are added at the moment of using. Fix objects for 12 to 24 hours in the dark, then treat with strong alcohol for 12 to 24 hours, and afterwards cut sections.

Kultschitzky (STAIN FOR NERVE CENTERS). Harden for 1 or 2 months in *Erlicki's* solution, imbed in celloidin, and cut. Stain sections for 1 to 24 hrs. in solut. made from 1 Gm. hematoxylin in a little alcohol with enough 2-% acetic acid added to make 100 Cc. Wash out in sat. solut. lithium- or sodium carbonate containing 10% of a 1-% solut. potassium ferricyanide, wash well with water, and mount in balsam.

Kunz-Krause (GLYCOTANNOIDS). Those glucosidal tannins which are derivatives of oxycinnamic acids are rapidly decomposed in the cold after a few days, with the formation of considerable prussic acid, on being treated with Liebermann's

reagent (solut. potassium nitrite, 6 Gm., in conc. H_2SO_4 100 Gm.).

Kupferschlaeger (TARRY MATTER IN AMMONIA). A brownish-red color forms on supersaturating with not too conc. HNO_3.

Kuskow (DIGESTION FLUID). Recently prepared solut. of 1 part pepsin in 200 parts 3-% solut. oxalic acid.

Labarraque (SOLUTION). Solut. sodium hypochlorite prepared like Javelle water (q. v.), using caustic soda instead of caustic potassa.

Labich (COTTONSEED OIL). 25 Cc. of melted fat are mixed with 25 Cc. solut. of 500 Gm. lead acetate in 1 liter water, previously warmed to 35° C., and 5 Cc. of ammonia water (22° Bé.), and stirred for several minutes until a homogeneous emulsion results. If cottonseed oil present, the mixture is colored orange-red. *Deiss* modified this test for detecting cottonseed oil in olive oil, by dissolving 10 Cc. oil in 100 Cc. ether, shaking the solut. with 5 Cc. conc. lead-acetate solut. and again shaking after adding 5 Cc. ammonia water.

Lachaux (INDICATOR). Corallin-malachite-green. Prepared by dissolving 3.1 Gm. commercial rosolic acid in 150 Cc. 90-% alcohol, neutralizing, and mixing with a solut. of 0.5 malachite-green in 50 Cc. alcohol. Gives with alkalies a purple color, and with acids a green.

Lacroix (TITANIUM). Dissolve the substance in HCl with a gentle heat; add one drop of the solut. to a solut. of morphine in H_2SO_4. If the substance contains titanium the liquid acquires a wine-red color at once. If the substance does not dissolve in HCl, fuse with Na_2CO_3 and treat the melt with H_2SO_4, then add one drop solut. morphine, when the color will develop.

Ladendorf (BLOOD). Tincture guaiac wood and oil eucalyptus are added to the liquid to be tested. If blood present the lower layer is colored blue; the upper one of oil eucalyptus, violet.

Lafon (DIGITALIN). Digitalin yields a bluish-green color with a solut. of 1 Gm. sodium selenate in 20 Gm. conc. H_2SO_4 (*Lafon's* reagent). In place of selenate, the tellurate may be employed.

Lagerheim (STARCH IN DRUGS AND FOOD PRODUCTS). Reagent is iodolactic acid, obtained by dissolving a few crystals iodine

in hot syrupy lactic acid. It strikes a blue color with all starch granules, and renders them visible.

Lagrange (GLUCOSE). Modified Fehling's solut., containing neutral copper tartrate, 10 Gm., and sodium hydrate, 40 Gm., dissolved in water, 500 Cc. It gives a red ppt. with glucose.

Laillier (OLIVE OIL). Characteristic color reactions are obtained on shaking 1 volume aqueous 1 : 4 chromic-acid solut. with 4 volumes of oil. Or, the simple chromic-acid solut. may be replaced by a mixture of chromic acid, 9, water, 30, and HNO_3 (sp. gr. 1.185), 80.

Lainer (BENZENE: BENZIN). 1.—Add a small fragment of iodine—benzene is colored carmine-red; benzin is colored violet. 2.—Add a trace of alcohol to liquid and shake—with benzene mixture becomes cloudy; with benzin it remains clear. Toluene and xylene also give cloudy liquids with alcohol.

Lamal (MORPHINE). Evaporate 2 to 10 drops morphine solut. on water-bath with a like quantity uranium-acetate solut. (0.015 Gm. uranium acetate and 0.01 Gm. sodium acetate in 5 Cc. water). Light-red or hyacinth-red permanent streaks remain. Oxymorphine, salicylic acid, tannin, gallic acid, and pyrogallol give a similar reaction; toxines and most alkaloids do not.

Landerer (STRYCHNINE). A violet color develops on heating gently with iodic acid or an iodate and H_2SO_4.

Landois (MACERATING MIXTURE). Mixture of 5 parts each of conc. soluts. neutral ammonium chromate, potassium phosphate, and sodium sulphate, with 100 parts distilled water. Used for macerations in the same way as chromic acid solut.

Landolt (PHENOL). Upon adding an excess of bromine water to a phenol solut., a white crystalline ppt. of tri-bromphenol is formed. Similar ppts. result with cresol, oxybenzoic acid, indol, indican, kynurin, and other compounds, a fact to be remembered when examining urine for phenol.

Landott (PARAFFIN IN BEESWAX). Strong H_2SO_4 attacks beeswax at once, but only very slowly affects paraffin.

Landsberg-Wislicenus (MORPHINE IN URINE). Add acetic acid to urine, evaporate to syrupy consistency, extract with cold absolute alcohol repeatedly, evaporate alcohol, exhaust resi-

due with water, add few drops acetic acid to solut., and shake out with amylic alcohol at 70° C. until washings no longer colored. Evaporate residual aqueous acid solut., make residue alkaline and treat latter with hot amylic alcohol repeatedly. Then evaporate solvent.

Lang (FIXING LIQUIDS). 1.—6 to 10 parts sodium chloride, 6 to 8 parts acetic acid, 3 to 12 parts mercuric chloride, 0.5 part alum, and 100 parts distilled water. The alum is sometimes omitted from this solut., which is used for *Planaria*. 2.—Add 5 per cent. acetic acid to a conc. solut. mercuric chloride in picro-sulphuric acid. See also *Kleinenberg*.

Lang (TAURINE). Taurine gives a white ppt. when a solut. is mixed with freshly pptd. mercuric oxide.

Langbeck (INDICATOR). Nitrophenol gives colorless solutions with weak acids and neutral soluts.; color is changed to yellow by alkalies.

Langbeck (METHYL ALCOHOL IN ETHER). Mix ether with a 2-% solut. silver nitrate and let stand 24 hours—if methyl alcohol present, zone of contact is light violet-red, and a ppt. of silver oxide forms proportionate to quantity of alcohol present.

Langerhan (GUM AND GLYCERIN MEDIUM). Modified Farrant solut. Dissolve acacia in an equal weight of water, and to each 10 Gm. add 5 Gm. glycerin and 10 Gm. 5-% aqueous solut. carbolic acid.

Langley (ALKALOIDS). On adding a mixture of HNO_3 and H_2SO_4 and then supersaturating with NaOH various alkaloids show characteristic colorations. See *Dragendorff's* "Ermittelung der Gifte," p. 283.

Langley (PEPSINOGEN AND PEPSIN). Sodium carbonate destroys pepsin, but has no action on pepsinogen.

Langley (PICROTOXINE). Mix with 3 to 4 parts potassium nitrate and moisten with H_2SO_4—no reaction; on adding excess of potassia, a reddish-yellow color develops.

Langley-Koehler (ALKALOIDS). Mix alkaloids with from 3 to 5 times their weight of potassium nitrate, then add 1 to 2 drops H_2SO_4, followed immediately by conc. soda-solution.

Lanz (STAIN). Sat. solut. fuchsine in 2-% aqueous solut. phenol, 10 Cc.; sat. solut. thionin in 2-% aqueous solut. phenol, 30 Cc. Stain specimen 15 to 30 seconds, and wash with water. Gono-

cocci are stained by thionin; nuclei take both stains. Both solutions should be freshly prepared.

Laronde (IODINE). On treatment with petroleum and nitric acid, the former is colored violet by the iodine.

Lasaulx (IRON). Particles of Fe separated from a substance by a magnet and treated with solut. tungstic acid are seen under the microscope to have blue margins. Organic matter must be absent, as well as zinc and copper.

Lassaigne (ACACIA). A transparent, gelatinous, yellow ppt. is obtained on adding solut. ferric sulphate.

Lassaigne (FLOUR). Mineral substances in flour are detected by shaking with chloroform and examining sediment.

Lassaigne (HYDROCYANIC ACID). A few drops KOH solut., followed at once by a few drops of copper-sulphate solut. and slight acidulation with HCl causes a white ppt. of cuprous cyanide if HCN present. A solut. of copper sulphate in sulphurous acid will also yield a ppt. in solutions containing HCN.

Lassaigne (IODINE). 1.—Solut. palladium nitrate or chloride affords a brown or blackish color. 2.—On treating with chlorine water, an iodide colors starch-paper blue.

Lassaigne (ORGANIC NITROGENOUS COMPOUNDS). Heat about 0.01 Gm. of substance with a small piece sodium, add 2 to 3 Cc. water and some ferroso-ferric salt solut. and acidulate with HCl—if any nitrogenous body present, a ppt. of Prussian blue forms.

Latschenberger (AMMONIA IN URINE). Treat urine with equal volume sat. solut. copper sulphate, neutralize with barium hydrate, filter, and apply Nessler's test to filtrate.

Laubenheimer (THIOTOLENE). This substance yields a bluish-green color with a solut. anthraquinone in glacial acetic acid. The coloring matter is pptd. by water, but is redissolved by ether to form a violet solut.

Laubenheimer-Godeffroy (ALKALOIDS). See *Godeffroy-Laubenheimer.*

Lauth (PARATOLUIDINE). Add HNO_3 to a solut. paratoluidine in H_2SO_4—color changes from blue to violet, then to red, and finally brown.

Lauth (SULPHURETTED HYDROGEN). Paraphenylene-diamine in slightly acid solutions, gives, on adding ferric chloride, a

violet color if sulphuretted hydrogen present. If a few grains para-amido-dimethylaniline sulphate are substituted for the paraphenylene-diamine, a reaction due to methylene blue is obtained (*Caro-Fischer's* reaction).

Lavdowsky (BILLBERRY-JUICE STAIN). Well wash fresh berries of *Vaccinium myrtillus*, then express juice and mix with twice its bulk distilled water mixed with a little 90-% alcohol. Heat for a short time and filter while warm. Dilute stain with 2 or 3 volumes distilled water before use.

Lavdowsky (CHLORAL-HYDRATE MACERATING MEDIUM). A 5-% aqueous solut. of chloral hydrate.

Lavdowsky (FORMALDEHYDE SOLUTIONS). 1.—Distilled water, 20 parts, alcohol (95-%), 10 parts; formaldehyde (40-%), 3 parts; glacial acetic acid, 0.5 part. 2.—Distilled water, 30 parts; alcohol (95-%), 15 parts; formaldehyde (40-%), 5 parts; glacial acetic acid, 1 part.

Lavdowsky (SANDARAC MEDIUM). Dissolve 30 Gm. sandarac in 50 Cc. absolute alcohol. If diluted with an equal volume absolute alcohol, this may be used for clearing sections.

Lawrence (GLYCERIN JELLY). Soak Nelson's gelatin in cold water for 2 or 3 hours, then pour off superfluous water. Next melt the gelatin, and after cooling somewhat, add to each fl. oz. a fluid dram egg albumin. Boil until albumin coagullates, then filter through fine flannel, and to each fl. oz. of the clarified solut. add a mixture of 0.25 fl. oz. glycerin and 0.5 fl. oz. camphor water.

Lea, Carey-. See *Carey-Lea.*

Lebbin (FORMALDEHYDE). Heat solut. containing formalde hyde to boiling for 30 seconds with a solut. resorcin in sodium hydrate. Formaldehyde gives a reddish tint, but albuminoids, if present, interfere with the reaction; chloroform affords a similar color.

Leber (PRUSSIAN BLUE IMPREGNATION METHOD). Treat tissue for a few minutes with 0.5-% solut. ferrous sulphate, then with 1-% solut. potassium ferricyanide, and wash with water.

Lechini (BLOOD IN URINE). Treat 10 Cc. urine with a drop glacial acetic acid and shake with 3 Cc. chloroform—if coloring matter from blood present, the chloroform will form a red layer at the bottom.

Leconte (URIC ACID). See *Babo's* test.

Lee (CELLOIDIN IMBEDDING METHOD). Objects are penetrated first with a 4- to 6-% solut. celloidin in a mixture of equal parts ether and absolute alcohol, and subsequently with a 10- to 12-% solut. (see *Elsching's* solut.). They are then arranged in position in small paper receptacles, which are filled with the thick solution and placed in a desiccator, on the bottom of which a little chloroform must be poured. When celloidin masses are hardened sufficiently on surface, remove them from the paper cases and turn them over from time to time, in order that they may be equally exposed on all sides to the action of chloroform vapor. As soon as masses are fairly hard, immerse them in Gilson's hardening mixture (chloroform, 1 part; cedar oil, 1 or 2 parts) and replace the chloroform as it evaporates with more cedar oil. When the objects are cleared throughout, expose the masses to the air, so that the last traces of chloroform may evaporate, and they will then be ready for mounting on holder of the microtome by means of a drop of thick celloidin solution.

Lee (FORMALDEHYDE SOLUTIONS). 1.—1 part of 40-% formaldehyde solut., 2 parts 1-% chromic-acid solut., and 4-% acetic acid. 2.—1 part 40-% formaldehyde solut., 4 parts of 1-% platinic-chloride solut., and 2-% acetic acid.

Lee (GLYCERIN MIXTURE). 1 part glycerin, 1 part alcohol, and 2 parts water.

Lee ("KERNSCHWARZ" STAIN). Stain material, if fresh, in "Kernschwarz" diluted with 10 volumes of water for a few minutes; otherwise leave in the undiluted liquid for 24 hours. Rinse in water, and then stain for 24 hours or more with safranine, gentian violet, Victoria blue, or a hematein stain. Safranine is preferred, and should afterwards be extracted with alcohol (acidulated, if necessary), followed by clove oil "Kernschwarz" is said to be a good stain for preparations that are to be photographed.

Lee (MOUNTING CELLOIDIN SECTIONS). Mount sections on Mayer's albumin, taking care to press them down very thoroughly, and remove the celloidin, if desired, by immersion in ether-alcohol.

Lee (OSMIC-ACID AND PYROGALLOL STAIN) Fix tissues in Hermann's mixture or Flemming's mixture for half an hour, then

place in a weak solut. pyrogallol, which may be prepared with alcohol in some cases. Safranine may be used as a second stain.

Lee (SUBLIMATE SOLUTION). See *Frenzel's* sublimate solution.

Lee (TURPENTINE-COLOPHONY MOUNTING MEDIUM). Highly recommended for general work, and is prepared by adding small pieces colophony to rectified oil turpentine, heating in a stove, and when solut. sufficiently thick, filtering twice in the stove. See *Kleinenberg's* colophony.

Leers (QUININE). A green color develops on shaking quinine in fine powder with ether, then adding chlorine water and ammonia.

Leewenthal-Lenssen (HYDROCHLORIC ACID). With a protochloride, free HCl gives off chlorine on treatment with lead peroxide.

Leffmann (URINE). Drinking water containing urine is colored brown with silver-nitrate solut.

Leffmann-Beam (FAT IN MILK ANALYSIS). Method consists in decomposition of milk with H_2SO_4 in a graduated tube, and separating the fat by means of a centrifugal machine, a little fusel oil being added to aid aggregation of oil globules.

Lefort (MORPHINE). A yellow to yellowish-brown color develops on adding iodic-acid solut. and then ammonia.

Lefort (STRYCHNINE). A violet color develops with H_2SO_4 and potassium bichromate.

Legal (ACETONE IN URINE). Treat several Cc. of distillate from urine with a few drops freshly prepared solut. sodium nitroprussiate and a few drops of soda or potassa lye—a red color develops. After this has faded, add excess acetic acid. If acetone present, a purple color is produced. Creatinine also shows a fading of the first-formed red color, but upon the addition of acetic acid, first a green and then a blue color forms. See *Le Noble's* reaction.

Legal (ALUM-CARMINE AND PICRIC-ACID STAIN). Mix 10 volumes Grenacher's or other alum-carmine with one of sat. picric-acid solut.

Leger (BISMUTH REAGENT). A solut. of cinchonine nitrate with potassium iodide, with which bismuth salts give a dark-red ppt.

Leger (DIFFERENTIATING ALPHA-NAPHTOL FROM BETA-NAPHTOL). Soda-lye (36° Bé.), 30 Cc.; water, 100 Cc.; bromine, 5 Cc. Add 2 drops of this hypobromite solut. to 10 Cc. conc. aqueous solut. of substance—if alpha-naphtol present, a dirty-violet color develops. With beta-naphtol a yellow color first forms, then turns greenish, and finally yellow. With alpha-naphtol reaction is obtained even on diluting conc. solut. with 9 parts water; on diluting beta-naphtol solut. with 2 parts water, a yellow color is still obtained, but it disappears at once on agitation. Reaction for beta-naphtol much less sensitive than for alpha-naphtol.

Lehmann (GLUCOSE). Dissolve substance in alcohol, add alcoholic potassa solut., then copper sulphate solut., and warm—if glucose present, separation of red cuprous oxide results.

Lehman-Petri (INDICATOR). Phenol nitrosylsulphonate. Gives a blue color with alkalies, and a red with acids.

Leismer (SUGAR IN URINE). 5 Cc. 0.1-% solut. safranine, 1 Cc. urine, and 2 Cc. soda lye are heated to boiling—if glucose present, the solut. is decolorized.

Le Noble (ACETONE IN URINE). Upon adding sodium nitroprussiate and ammonia to urine containing acetone a violet color gradually forms. See *Legal's* test.

Lenz (ALKALOIDS). Certain alkaloids give characteristic color reactions when heated to redness with caustic potassa, containing so much water that it is solid at ordinary temperature, but melts when heated on the water-bath. *Quinine* and *quinidine* give a green color; *cinchonine* and *cinchonidine* a greenish blue; *cocaine* a greenish yellow.

Lenz (PILOCARPINE). Triturate the alkaloid or its hydrochlorate with 100 parts calomel—a gray to black color develops, due to reduction of calomel. In case of pilocarpine nitrate, according to *Nagelvoort*, the free base must first be liberated by NH_3, and extracted with chloroform. The residue left on evaporation of latter is then treated as above.

Lenz (SHIKIMI FRUIT IN STAR ANISE). Boil 1 carpel for 2 minutes with 5 Cc. 95-% alcohol, cool, filter, and add 4 to 5 volumes of water to filtrate—if fruit star anise, liquid becomes cloudy (due to anethol); if shikimi, liquid remains clear. If

shikimi extract shaken with petroleum ether, ethereal extract scarcely leaves any residue on evaporation, and the trace left has a disagreeable odor. Star-anise extract similarly treated leaves an oily residue of anise odor.

Leonardi (ALCOHOL IN ESSENTIAL OILS). Fuchsine dissolves in alcohol, but not in the pure oils.

Leonardi (CASTOR OIL IN OLIVE OIL). Shake 10 Cc. suspected oil with 5 to 10 Cc. 95-% alcohol and set aside till two distinct layers form. If olive oil pure, its volume will increase; if castor oil present, alcohol volume will increase.

Lepage (ALKALOIDS). A white or yellowish ppt. is afforded by a solut. of cadmium iodide, 10, and potassium iodide, 20, in water, 60 to 80. See *Marmé's* test.

Lepage (POTASSIUM IODIDE). Test purity of potassium iodide by dissolving in 30-% alcohol and examining residue, if any.

Lepel (MAGNESIUM SALTS). The violet color of a solut. of alkanin in a mixture of alcohol, 2, and ether, 1, is changed to blue.

Letheby (ANILINE). 1.—A blue to purple color is given with H_2SO_4 and lead or manganese dioxide. 2.—A blue to purple color is afforded with H_2SO_4 and potassium ferricyanide. 3.—A bronze-blue to pink color develops on adding dil. H_2SO_4, placing 2 drops on platinum foil and passing a current from a Grove battery. 4.—A blue color forms upon heating to 50° C. with manganese dioxide and diluted sulphuric acid.

Letheby (ARSENIC). Cause evolution of arseniuretted hydrogen and pass gas into silver-nitrate solut.—the latter is colored brown to black.

Leube (QUININE). Chlorine water, potassium ferrocyanide, and ammonia cause a red color.

Leuchs (WATER IN ESSENTIAL OILS). Shaking with petroleum spirit causes a cloudiness.

Lewin (ACROLEIN AND OTHER ALDEHYDES). Add a trace to mixture of piperidin and sodium nitroprussiate—a gentian-blue color develops, changed to violet by NH_3; to reddish-violet, then rust-color by NaOH; to bluish-green by glacial acetic acid; and to rusty-brown by mineral acids. On adding

water, however, the blue color is restored. Hydrogen dioxide gives a dirty-brown. Instead of piperidin, dimethylamine may be used. Reaction is afforded with acetaldehyde, paraldehyde, propionic aldehyde, formaldehyde, trichloraldehyde, isobutyraldehyde, benzaldehyde, salicylaldehyde, phenylacetylaldehyde, œnanthol, and furfural.

Lewin (BILIARY PIGMENTS). The urates separated by strongly cooling urine are filtered out, washed, dissolved in hot water, and the solut. tested for biliary pigments. See *Gmelin's* test.

Lewin (SESAME OIL). See *Baudouin's* test.

Lewis, Bevan- (BLUE-BLACK NERVE-CENTER STAIN). Sections are stained for one hour in 0.25-% aqueous solut. aniline blue-black, and in the case of the cortex of the cerebellum, washed out for 20 to 30 minutes in a 2-% chloral solut., prior to cleaning and mounting.

Lewis, Bevan- (HARDENING PROCESS FOR BRAIN). Keep in methylated spirit for 24 hours in a cool place, then transfer to Mueller's solut. for 3 days, after which change the liquid and, at end of another 3 days, substitute a 2-% solut. potassium bichromate. At end of 2 weeks use a 4-% solut. bichromate, and if material is unfit for section cutting in another week, treat with chromic-acid solut.

Lewy (COCAINE HYDROCHLORATE). On adding borax to an aqueous solut. a ppt. forms, soluble in glycerin. On warming this solut. latter becomes cloudy, but clears up again on cooling.

Lewy (SYPHILIS-TUBERCLE STAIN). Stain with carbol-fuchsine and decolorize with water.

Lex (AMMONIA). Phenol and chlorinated-lime solut. develop a green color which changes to blue on warming.

Lex (PHENOL REACTION). Add a solut. of a hypochlorite (chlorinated-lime solut. 1 : 20), or bromine water (*Cotton's* modification), to an ammoniacal phenol solut.—a green color develops, changing to blue upon warming.

Leys (SACCHARIN). To 5 Cc. of a 1 : 2,500 solut. saccharin add 2 drops dil. solut. Fe_2Cl_6 and 2 Cc. H_2O_2—in from 30 to 45 minutes a permanent violet color develops.

Lidof (ALBUMINOIDS). On gently heating a solut. of any albuminoid substance with $AgNO_3$ and a slight excess KOH a

brown color develops, growing darker until liquid has a very deep tint.

Lidoff (TEXTILE FABRICS). Silk is readily soluble in powdered oxalic acid (on fusing). Cellulose is less soluble, and wool fiber insoluble.

Lidow (ALBUMINOIDS). Warm a solut. of a proteid with silver nitrate and slight excess of caustic potassa—color gradually darkens until cinnamon-brown.

Lieben (ACETONE). To solut. (*e. g.*, urine distillate) add a solut. iodine in potassium iodide and a few drops of caustic-potassa solut.—iodoform forms if acetone present. Alcohol gives the same reaction. See *Gunning's* test.

Lieben (ALCOHOL). Iodoform forms on adding a fragment of iodine and sufficient potassa to make a clear solution.

Lieben (FORMIC ACID). Reducing action of formic acid on potassium permanganate is utilized for determining acid present in a liquid. For details see MERCK'S REPORT, iv, p. 47.

Liebermann (ALBUMINOIDS). Fuming HCl affords a bluish-violet color with albuminoids on boiling.

Liebermann (CHOLESTERIN). A solut. of cholesterin compounds in acetic acid anhydride, and, according to Burchard, with addition of chloroform, is colored rose-red by conc. H_2SO_4. The color rapidly changes to blue and green.

Liebermann (DIAZO- AND NITROSO COMPOUNDS). These yield intense colors with a mixture of phenol and H_2SO_4.

Liebermann (GLYCOTANNOIDS). Potassium nitrate, 6 Gm.; conc. H_2SO_4, 100 Gm. Glycotannoids are decomposed by reagent with formation of HCN.

Liebermann (LANOLIN). Dissolve 0.1 to 0.2 Gm. lanolin in 4 Cc. acetic-acid anhydride and add H_2SO_4—a rose-red color, changing to green or blue, develops. Glycerin fats do not give the reaction.

Liebermann (PHENOL). Warm phenol with H_2SO_4, in which 5% sodium nitrate has been dissolved—blue color forms. Addition of water causes a brown ppt.

Liebermann (SULPHUROUS ACID IN WINE). 1.—Reduce to sulphuretted hydrogen with sodium amalgam and HCl. 2.—Distil, and shake distillate with few drops solut. iodic acid and some chloroform—latter is colored violet.

Liebermann (TEXTILE FABRICS). Dye fabric for half an hour in a fuchsine solut. rendered light-yellow by caustic-soda solut. and then wash with water—silk is colored dark-red; wool, light-red; flax, pink; cotton remains colorless.

Liebig (ALDEHYDE). Ammoniacal solut. silver nitrate causes formation of a mirror.

Liebig (CONIINE). On passing dry chlorine gas over coniine, the latter acquires a purplish-red to blue color.

Liebig (CYANIDES). Titrate in slightly alkaline solut. with decinormal silver-nitrate solut. till permanent opalescent ppt. forms. 1 Cc. $AgNO_3$ solut. = 0.0054 HCN.

Liebig (CYSTINE). The cystine obtained from urine sediment yields a black ppt. of lead sulphide on boiling with solut. lead oxide in soda lye.

Liebig (HYDROCYANIC ACID). On evaporating HCN with ammonium sulphide after adding a few drops caustic-potassa solut., dissolving residue in water, and acidulating slightly with HCl, a blood-red color forms upon adding ferric-chloride solut.

Liebig (QUININE). Shake 0.5 Gm. quinine sulphate in a stoppered test-tube with 5 Cc. of ether (sp. gr. 0.728) and 1 Cc. of ammonia—two clear layers should form on standing. A turbidity indicates presence of cinchonine or allied alkaloids. Compare with the more delicate tests of *Kerner*, *Schaefer*, and *De Vry*.

Liebig-Woehler (UREA). On evaporating a urea solut. with silver nitrate, silver cyanate and ammonium nitrate are formed.

Liebman (ALPHA-NAPHTOL IN BETA-NAPHTOL). Dissolve 0.144 Gm. naphtol in 5 Cc. alcohol and 15 Cc. toluene in a graduated tube. In a separate tube dissolve 0.14 Gm. paranitraniline in 9 Cc. dil. HCl, cool, and diazotize with 1 Cc. normal sodium-nitrite solut. Add 1 Cc. of latter solut. to naphtol solut., shake, and add water. After two layers formed, remove toluene layer and shake it with 5 Cc. normal caustic-soda solut., and compare color with that similarly obtained with a solut. beta-naphtol containing known quantities of alpha-naphtol.

Liebreich (CHOLESTERIN AND CHOLESTERIN FATS). See *Burchard's* test.

Lifschuetz (CELLULOSE). Mixture for dissolving cellulose consists of a mixture of H_2SO_4 and HNO_3.

Lightfoot (PYROLIGNEOUS MATTER IN ACETIC ACID). Neutralize with sodium- or potassium carbonate and add a few drops solut. potassium permanganate—the pink color of the latter is discharged in a few minutes.

Linde (GLYCERIN IN FLUID EXTRACTS). 1.—Render solution slightly alkaline with dilute sodium-carbonate solut., then mix with powdered borax on a watch crystal—if glycerin present, a small quantity of the mixture introduced into an alcohol or gas flame upon a platinum wire will color the flame green. 2. —Red litmus-paper is made blue by saturating with a conc. borax solut. Upon moistening this paper with the glycerin solut. previously rendered slightly alkaline, the red color reappears more or less rapidly, depending on the concentration of glycerin solut. See also *Hager's* glycerin reaction.

Lindemann-Motten (ALKALOIDS, SACCHARIN, AND SALICYLIC ACID). Detection depends upon fact that a substance in presence of two non-miscible solvents (separated by a membrane) passes into both, and in definite proportions. For details see MERCK'S REPORT, ii, p. 212.

Lindo (ALKALOIDS). Dissolve alkaloid in diluted H_2SO_4, and add ferric chloride. For resulting color reactions, see *Hager's* "Pharm. Praxis," 1886, III, p. 64.

Lindo (ELATERIN). Treat with 1 or 2 drops phenol and 2 or 3 drops H_2SO_4— a crimson to scarlet color develops.

Lindo (GLUCOSE). Add a solut. of brucine in HNO_3 to a solut. of glucose in soda- or potassa lye—a yellow color, changing to an intense blue, develops.

Lindo (MORPHINE). Copper sulphate, 1; water, 10; ammonia, sufficient to make a clear solut. Reagent gives with morphine an emerald-green color.

Lindo (NITRATES AND NITRITES). One drop 15-% HCl, one drop of 10-% resorcin solut., and 2 Cc. pure conc. H_2SO_4 to 0.5 Cc. of a solut. of a nitrate or nitrite, yields a purple-red color.

Lindo (NITRIC ACID). A deep-brown to red color develops on adding to nitric acid 8 or 10 drops phenol mixed with 30 drops of a cooled mixture of H_2SO_4, 2, and water, 1.

Lindo (PHENOL). Inverted nitric-acid test (*q. v.*).

Lindo (SACCHARIN). Evaporate saccharin to dryness with conc. HNO_3, treat residue with a few drops solut. potassa in 50-% alcohol, and warm—blue, violet, purple, and red colors appear in succession.

Lindo (SANTONIN). Dissolve in H_2SO_4 without heat, and add very dilut. solut. ferric chloride in small successive quantities —a red to purple or violet color develops on agitating.

Lipowitz (OLIVE OIL). Purity of oil is estimated by noting color, degree of emulsification, etc., on rubbing it with one-eighth its weight chlorinated lime.

Lipowitz (PHOSPHORUS IN ORGANIC MATTER). Add H_2SO_4, boil half an hour with some lumps of sulphur, and distil. Wash sulphur and examine for luminosity and odor. Add some HNO_3 to distillate, and test for phosphoric acid.

Lipp (DEXTRIN). A cold sat. solut. lead acetate is heated to 60° C. with sufficient lead oxide to solidify the mass, which is later extracted with water, and the solut. filtered. This solut. gives a white ppt. when boi ed with a dextrin solut.

List (HEMATOXYLIN-EOSINE STAIN). Stain sections for 24 hours in a solut. of 3 or 4 drops Renaut's hematoxylin-glycerin in 250 Cc. water, and then for a few minutes in a mixture of 1 part 0.5-% aqueous solut. eosine with 3 parts absolute alcohol.

List (METHYL-GREEN-EOSINE STAIN). Stain sections for a few minutes in a mixture of 3 parts absolute alcohol with 1 part of 0.5-% aqueous solut. eosine, then wash, and stain for 5 minutes in a 0.5-% aqueous solut. methyl green. Wash, dehydrate, clear, and mount in balsam.

Livache (FATTY OILS). Note increase in weight of oils when mixed with finely divided lead.

Lloyd (ALKALOIDS). Hydrastine mixed with various alkaloids, and treated with conc. H_2SO_4 for 5 minutes gives various reactions. For details see MERCK'S REPORT, X, p. 258.

Lloyd (WATER IN SPIRIT NITROUS ETHER). Milkiness is produced on shaking with chloroform or (? and) castor oil.

Lochini (ALKALOIDS). Solut. potassium bichromate in hot conc. H_2SO_4 gives with veratrine a yellow color.

Loeffler (BACTERIA STAIN). Place section in Loeffler's methylene-blue solut. (or conc. aq. solut. of any stain will do), then

place in 0.5-% acetic acid solut. for a few seconds, then in absolute alcohol and in cedar oil, and mount in Canada balsam.

Loeffler (FLAGELLA STAIN). 1.—Prepare mordant by adding 5 Cc. cold sat. solut. ferrous sulphate and 1 Cc. aqueous or alcoholic solut. fuchsine, methyl violet or "Wollschwarz," to 10 Cc. of 20-% aqueous solut. tannin. Typhoid bacilli require addition of 1 Cc. of 1-% solut. sodium hydrate; *Bacillus subtilis* require 28 to 30 drops, and the bacilli of malignant œdema require 36 to 37 drops. In case of cholera bacteria add 0.5 to 1 drop H_2SO_4 to the soda solution, and for *Spirillum rubrum* add 9 drops. Cover-glass preparations are made and fixed in the flame, then treated with above mordant and heated for half a minute, after which they are washed in distilled water and then in alcohol. Stain by treating in a similar manner with a sat. solut. fuchsine in aniline water, the solut. being preferably neutralized to point of precipitation by cautiously adding 0.1-% NaOH solut. 2.—Gallic-acid solut. 1 in 4, 10 Cc.; cold sat. ferrous sulphate, 5 Cc.; and alcoholic fuchsine solut., 1 Cc. *Fischer's* modification of this consists of tannin solut. 1 in 10, 20 Cc.; ferrous-sulphate solut. 1 in 2, 4 Cc.; and alcoholic solut. fuchsine, 1 Cc. The sections are macerated in this with heat, washed in water, then stained with conc. aqueous solut. fuchsine. For further details see *Journal of the Royal Microscopical Society*, 1890, p. 678.

Loeffler (MACERATING FLUID). *a.*—To 10 Cc. of a 20-% aq. solut. tannin add, drop by drop, aq. solut. ferrous sulphate until solut. is deep violet. Then add 3 to 4 Cc. logwood infusion (1 : 8). If more logwood is added, a granular condidition occurs, which renders the staining functions of the solut. useless. The fluid is dark-violet for several days, then gradually changes to deep-black. The scum which develops on the surface does not interfere with the solut. The addition of 4 or 5 Cc. of 5-% carbolic acid renders the solut. permanent, and does not affect the macerating strength materially. Keep solut. in well-stoppered bottles. *b.*—Tannin solut. (20-%) 10 Cc.; sat. solut. ferrous sulphate, 5 Cc.; aqueous or alcoholic solut. fuchsine, methyl violet, or wool black, 1 Cc.

Loeffler (WEAK ALKALINE ANILINE WATER). Add 1 Cc. of a 1-% solut. NaOH to 100 Cc. saturated aniline water.

Loeffler (SOLUTION). Conc. alcoholic solut. methylene blue, 30 Cc.; solut. potassium hydrate (1:10,000), 100 Cc. Mix and filter shortly before use. Stain sections for a few minutes (tubercle sections for some hours), and remove excess of stain by immersion for a few seconds in 5-% acetic acid. Dehydrate in absolute alcohol, clear in cedar oil, and mount in balsam.

Loew (CREATIN). On treatment with ammoniacal copper creatin is oxidized to oxalic acid and methylguanidin.

Loewe (GLUCOSE). Solut. of 16 Gm. copper sulphate in 64 Gm. water with 80 Cc. soda lye (sp. gr. 1.34) and 6 to 8 Gm. of glycerin (gradually added to avoid heating), gives with glucose or diabetic urine a red ppt. upon warming. For quantitative estimation the reagent is prepared as follows: 15.621 Gm. of cupric hydroxide (from 40 Gm. of crystallized copper sulphate) are warmed while still moist, with 30 Gm. of glycerin, 80 Cc. soda lye (sp. gr. 1.34), and 160 Cc. water until dissolved, and sufficient water added to make whole measure 1155 Cc. 10 Cc. of this solut. correspond to 0.05 Gm. glucose. See *Fehling's* solution.

Loewenthal (GLUCOSE). Solut. of 60 Gm. tartaric acid, 240 Gm. of sodium carbonate, and 5 Gm. crystallized ferric chloride in 500 Cc. hot water gives with glucose solut. or diabetic urine a brown ppt. when boiled with it.

Loewenthal (HYDROCHLORIC ACID). Lead peroxide liberates chlorine in solutions containing free hydrochloric acid and chlorides (other than those of iron and tin).

Longi (NITRIC ACID). An aqueous solut. paratoluidine sulphate gives with a solut. containing HNO_3 on the addition of an equal volume of conc. H_2SO_4 a red zone, which later changes to yellow. In the presence of chlorates, bromates, iodates, chromates, and permanganates, a blue color develops. Nitrous acid gives a yellow color afterwards changing into red.

Loof (MORPHINE). Froehde's reagent in different strengths yields different reactions with morphine. A solut. 0.05 to 0.1 Gm. ammonium molybdate in 1 Cc. H_2SO_4 yields a dark-lilac color changing to a permanent blue. A solut. of 0.001 Gm. salt in

1 Gm. H_2SO_4 gives first a lilac, then a dirty greenish-blue becoming yellowish by degrees. A solut. of 0.01 Gm. molybdate in 1 Cc. acid causes a dark-lilac, then dirty-brown gradually becoming green.

Loubian (INDICAN). Modification of Hammarsten's reaction, in which hydrogen dioxide is substituted for calcium hypochlorite to convert indican into indigo. Two Cc. urine are mixed with an equal volume chloroform and 1 Cc. of 5- to 10-% solut. hydrogen dioxide. Conc. HCl, 2 Cc., is then added, and the mixture warmed and well shaken; the presence of indican is shown by the deep-blue color of chloroform layer.

Lovett (CEMENT). Grind very fine and mix dry 2 parts white lead, 2 parts red lead, and 3 parts litharge. Keep powder in a bottle, and when required for use mix a little with japanner's gold size to consistency of paint.

Lowe (CRYSTALLIZABLE PHENOLS IN "CARBOLIC" DISINFECTANTS). Distil 100 Cc. in two fractions, the first containing all the water and 10 per cent. of the oils, the second 62.5 per cent. This fraction is cooled, a crystal of phenol added, and the rise in temperature on crystallization taken with a delicate thermometer. From this the quantity of phenol present is deduced.

Lowit (GOLD METHOD). Place small pieces of fresh skin in formic acid (sp. gr. 1.12) diluted with an equal bulk water, and when epidermis peels off transfer to 1.5- or 1-% gold-chloride solut. for 15 minutes; next treat, in the dark, with dilute formic acid (1 part with 1 to 3 of water) for 24 hours, and subsequently for a smiliar length of time with undiluted formic acid. Thin sections are then cut and mounted in dammar or glycerin.

Luchini (VERATRINE). Solut. potassium bichromate in hot conc. H_2SO_4 gives with veratrine a yellow color.

Luchsinger (GLYCERIN IN URINE). The alcoholic extract has a sweet taste, dissolves copper hydrate in presence of soda-lye, and on distillation with potassium bisulphate yields acrolein.

Luck (CARBON DISULPHIDE IN MUSTARD OIL). Distil oil in a water-bath and add to distillate alcoholic potassa solut., a slight excess acetic acid, and copper-sulphate solut. A lemon-yellow ppt. indicates presence of carbon disulphide.

Luck (INDICATOR). Phenolphtalein Colorless with acids; purplish-red with alkalies.

Ludwig (ALCOHOL). See *Otto's* test.

Ludwig (ANILINE). Add phenol and solut. sodium hypochlorite to aqueous solut.—a dark-blue develops, changed to red by HCl.

Ludwig (MERCURY IN URINE). The mercury is pptd. on metallic zinc or copper, and the amalgam heated in a capillary tube, the sublimed and evolved mercury being then identified by conversion into red iodide.

Ludwig (POTASSIUM CHLORATE IN VOMIT). Add acetic acid, boil for 1 minute, filter, evaporate to small bulk, and set aside. Collect crystals and dry with blotting paper. Treat crystals with warm dil. HCl—chlorine gas is evolved.

Luebimoff (BOROFUCHSINE). To 20 Cc. dist. water add 0.5 Gm. boric acid, then add 15 Gm. absolute alcohol; when dissolved add 0.5 Gm. fuchsine, and agitate.

Luebimoff (LEPRA BACILLUS STAIN). Stain section ½ to 24 hours in borax-fuchsine, then place in H_2SO_4 (1:5) for a few seconds till dark-brown color changes to yellow-brown, then wash in alcohol, place in oil, and mount in balsam.

Luebimoff (TUBERCLE DOUBLE STAIN). Stain 24 hours in cold borax-fuchsine solut., decolorize in H_2SO_4 (1:5). Decolorization is not as rapid as with lepra bacilli (differentiation).

Luecke (HIPPURIC ACID). Heat residue obtained by boiling to dryness a mixture of hippuric acid and conc. HNO_3—a strong odor of nitrobenzene develops.

Luedy (UREA). Add excess of orthonitro-benzaldehyde to alcoholic solut., evaporate to dryness; wash residue twice or thrice with warm alcohol, and boil it with a solut. of phenylhydrazine hydrochlorate and 5 to 10 drops 10-% H_2SO_4—urea causes a redness.

Luff (URIC ACID IN BLOOD). Fresh blood is allowed to flow direct into its own volume rectified spirit, with which it is thoroughly agitated; the mixture is then evaporated on water-bath until the mass can be reduced to a coarse powder, which is dried in the water-oven and afterwards finely powdered. The admixture of the blood with the spirit precipitates the

albuminous matters in a granular form, so that when dried the blood can be reduced with ease to a fine powder. One part of the dried blood is taken as being equal to five parts of liquid blood. For the extraction and estimation of uric acid in blood, from 50 to 100 Gm. of the powdered blood should, if possible, be taken. The extraction is effected by adding 100 Gm. powdered blood to a liter boiling distilled water, and allowing the mixture to boil for half an hour, during which time it is frequently agitated. It is then filtered, first through glass-wool, and afterwards through filter-paper, and evaporated down to 50 Cc.; this liquid is filtered, allowed to cool, and then submitted to the Gowland-Hopkins process for the determination of uric acid. See the *Journal of Pathology and Bacteriology*, 1893, i, p. 451.

Lugol (ALBUMIN IN URINE). Iodine, 2 Gm.; potassium iodide, 3 Gm.; water, 250 Gm.; glacial acetic acid, 250 Gm.

Lugol (INJECTION). Iodine, 1.2 Gm.; potassium iodide, 1.8 Gm. water, to make 30 Gm.

Lugol (STAINING BACTERIA). Iodine, 1; potassium iodide, 2; water, 300 (or Gram's iodine solut.). Bacteria are stained in a solut. made by shaking 15 drops aniline with 15 Cc. water, filtering, and adding 4 or 5 drops gentian-violet solut. After staining, they are immersed in the iodine solut., then in absolute alcohol until decolorization. Certain bacilli (*e. g.*, anthrax) retain the color; others (cholera, typhoid, bacterium coli) are decolorized.

Lunge (BICARBONATES IN CARBONATES). To a weighed quantity of solid bicarbonate add excess semi-normal NH_3 followed by excess of barium chloride. The whole is made up to a known volume and a definite portion filtered through a dry filter. This is then titrated with normal acid. Alkalinity indicated represents the carbon dioxide existing as bicarbonate in the quantity of liquid taken.

Lunge (INDICATORS). 1.—Tropæolin or methyl-orange—changed from yellow to crimson by mineral acids, but indifferent to carbon dioxide and sulphuretted hydrogen. 2.—Phenacetolin —obtained by heating for several hours 1 equivalent each of carbolic, sulphuric, and glacial acetic acids—color changed from brown to red by alkalies

Lunge (NITROUS ACID). Depends upon *Griess* reaction (*q. v.*) with sulphanilic acid and alpha-naphtylamine, which, according to Lunge, are kept on hand dissolved in dilute acetic acid. Solut. containing nitrous acid is colored red by this reagent. For quantitative determinations employ:

Lunge-Lwoff (NITROUS ACID). Colorimetric test carried out by means of solut. 0.1 Gm. alpha-naphtylamine in 100 Cc. water, 5 Cc. glacial acetic acid, and 1 Gm. sulphanilic acid, in 100 Cc. water. Normal solut. contains 0.01 Mg. nitrogen from nitrites per Cc. (0.0493 Gm. sodium nitrite dissolved in 100 Cc. water, and 10 Cc. of this solut. diluted to 100 Cc. with conc. H_2SO_4). Place in each of two cylinders 1 Cc. reagent and 40 Cc. water, then add to the one 5 Gm. sodium acetate, and 1 Cc. normal solut. of substance; to the other, 6 Cc. solut. to be tested—compare the colors.

Lunge-Lwoff (NITRIC ACID IN PRESENCE OF NITROUS ACID). Colorimetric determination by means of a solut. of 0.2 Gm. brucine in 100 Cc. pure conc. H_2SO_4. Mix 1 Cc. normal solution (10 Cc. solut. of 0.0721 Gm. KNO_3 in 100 Cc. water are diluted to 100 Cc. with conc. H_2SO_4) and 1 Cc. solution to be tested each with 1 Cc. brucine solut. Make both up to 50 Cc., with conc. H_2SO_4, heat to 70° or 80° C., cool, and after solutions have acquired a sulphur-yellow color, compare intensities of colors in suitable test-tubes. The above normal solut. contains 0.01 Mg. nitrogen from nitrates in 1 Cc.

Lustgarten (CHLOROFORM). Add a solut. alpha- or beta-naphtol in potassa solut. to liquid and warm—a blue color develops. Reaction also afforded by chloral.

Lustgarten (IODOFORM). 1.—Upon warming 1 or 2 drops of an iodoform solut. with a little phenol and KOH, a red ppt. forms, and which yields a red solut. with alcohol. 2.—Dissolve 0.1 Gm. resorcin and a piece of sodium in 5 Cc. alcohol. Five drops of the resulting green solut. are mixed with an ethereal iodoform solut., and the ether cautiously evaporated—a cherry-red color results, destroyed by acids, but restorable by alkalies.

Lustgarten (LEPRA-BACILLUS STAIN). Stain with aniline-water fuchsine or gentian-violet, and decolorize in 1-% solut. chlorinated soda for some time, then rinse thoroughly in water. Tubercle bacilli are decolorized earlier than lepra bacilli.

Lustgarten (NAPHTOLS). Alpha- and beta-naphtol dissolved in alcoholic potassa solut. and warmed with chloroform to 50° C. yield clear, blue soluts. reddened by acids. See *Wolff's* test.

Lustgarten (STAINING SYPHILIS BACILLI). Place sections in gentian-violet aniline water (see *Koch-Ehrlich* method) at the ordinary temperature for 12 to 24 hours, then for 2 hours at 40° C. Next transfer to absolute alcohol for a few minutes, then place for 10 seconds in a 1.5-% potassium-permanganate solut. and afterwards wash in sulphurous acid. If ground substance of sections not completely decolorized, repeat second part of process, then dehydrate, clear, and mount in balsam.

Lutesch (STAINING FLAGELLA). Mordant with freshly prepared solut. ferric acetate, to each 16 Cc. of which 5 to 10 drops acetic acid have been added, then wash in water, treat with 20-% acetic acid, again thoroughly wash, and finally stain with a hot solut. fuchsine or gentian-violet in aniline water.

Luttke (FREE HYDROCHLORIC ACID IN GASTRIC JUICE). Yellow color of tropæolin OO is changed to red by free acid. See *Riegel's* test and *Boas'* test.

Lutz (MICROCHEMICAL REAGENT). Add NH_3 to a sat. solut. methyl green in 90-% alcohol until decolorization, then add acetic acid by drops till ppt. just redissolved. Macerate sections in the solut., then transfer after a few minutes to water acidulated with acetic acid. Green color rapidly develops and becomes localized on elements just like fuchsine, but weaker; it is intensified on lightly warming sections. Reagent is adapted for use by artificial light.

Lutz (TANNINS IN DRUGS). Copper sulphate, 2 Gm.; ammonia water, sufficient to just dissolve ppt.; water, to make 100 Gm. Immerse drug in solut. for several hours, make sections, which wash well with water and imbed in glycerin-gelatin or Canada balsam. Tannins then appear dark-brown to black, and may be readily distinguished.

Lutz-Unna (LEPRA-BACILLUS DOUBLE STAIN). Iodide-para-rosaniline method. Stair in heated dil. aniline-water gentian-violet solut. till section dark-blue violet, then carry from one to other of following, allowing a few minutes to each: Solut. KI, absolute alcohol containing 10- to 50-% HNO_3, then pure

absolute alcohol. Repeat process several times (omitting KI at last) till section is only bluish-green or slate color, then clear in thymol or olive oil, and mount in balsam.

Lux (FATTY OILS IN MINERAL OILS). In a paraffin bath kept at from 200° to 210° C., heat for 15 minutes two samples of oil contained in test-tubes, to one of which some of NaOH has been added, to the other a few fragments of metallic sodium. Even if specimen contains only 2% fatty oil, one or the other sample, but generally both, will solidify and form a stiff mass.

Lux (INDICATOR). The colorless alcoholic solut. of flavescin, an extract from oakwood, is turned yellow by alkalies, and decolorized by acids.

Lyon (MIXTURE FOR EXTRACTING STRYCHNINE AND BRUCINE). Three volumes ether, and 1 volume of a mixture of 88 Cc. chloroform, 12 Cc. alcohol, and 2 Cc. ammonia.

Lythgoe (ANILINE ORANGE IN MILK). Mix 15 Cc. milk and 15 Cc. HCl (sp. gr. 1.20) in a casserole, and gently shake to cause thorough mixing and breaking up of curd into coarse lumps—if aniline orange present in milk, curd will be pink; if no coloring matter present, curd will be white or yellowish.

Mack (STRYCHNINE). With H_2SO_4 and MnO_2, strychnine gives a dark blue color, changing to violet, pink and yellow.

MacLagan (COCAINE). Treat 50 Cc. of an approximately 0.1-% solut. of a cocaine salt with 2 to 3 drops of NH_3, and rub vigorously walls of the glass vessel with a glass rod—pure cocaine separates out in crystals; a milky turbidity indicates presence of amorphous alkaloids (isatropyl-cocaine).

MacMunn (INDICAN). Modification of Hammarsten's reaction. Boil equal volumes urine and HCl with a few drops HNO_3, cool, and shake with chloroform—last becomes violet, and shows indigo absorption bands.

MacWilliam (ALBUMIN). A conc. aqueous solut. of salicyl-sulphonic acid gives a white ppt. with albumin, globulin, myosin, and derived albumins. With albumoses, the ppt. dissolves on heating; peptones give no ppt. except in solut. saturated with ammonium sulphate. See *Roch's* test.

Magini (STAIN FOR NERVOUS CENTRES). Improved Golgi's method. Harden cubes measuring 2 or 3 Cm. for 2 or 3 months in Müller's solut., then wash well with distilled water,

and place in 0.1- to 1-% solut. $ZnCl_2$. Change solut. for fresh every day for 7 to 10 days until it ceases to become more yellow than bichromate solut., then cut sections, wash quickly with alcohol, imperfectly clear with creosote, and mount in dammar.

Magnanini-Ciamician (SKATOL). See *Ciamician-Magnanini.*

Magnier de la Source (URIC ACID). Triturate sediment from urine with water, add a few drops of bromine water, and evaporate—if uric acid is present residue is brick-red; on dissolving it in KOH solut. a blue color results; with NH_3 solut. is purple.

Mahomed (HEMOGLOBIN IN URINE). Dip blotting-paper in urine, dry over alcohol-lamp, drop on 2 drops tinct. guaiac, evaporate off alcohol, and let 1 drop of ozonized ether fall on spot—a blue color develops.

Mährenthal, Von- (STAIN). See *Lee's* osmic-acid and pyrogallol stain.

Maier (IODINE). A blue color develops on adding a very dilute solut. KI to a solut. of an iodide mixed with starch paste and H_2SO_4.

Maier (TURPENTINE IN ESSENTIAL OILS). Note optical behavior of oils in a polarizing apparatus. See *Am. Journ. Pharm.*, xxxvii, p. 338.

Mai-Hilger (COLORING IN URINE). See *Hilger-Mai.*

Maisch (CROTON OIL) Treat oils suspected to contain croton oil with alcoholic potassa solut., add water and HCl to separated alkaline layer, and apply oil which separates to the skin—a peculiar eruption results if croton oil present.

Maisch (CURCUMA). See *Maisch's* test for turmeric. Also see *Howie's* test.

Maisch (ESSENTIAL OILS). Note the appearance: (1) on letting 1 drop bromine fall upon 5 drops oil in a watch-glass; (2) on adding 5 drops ethereal solut. of bromine (ether 5, bromine 1) to 5 drops oil. See *Proc. Am. Pharm. Assoc.*, 1859, p. 338.

Maisch (NITROBENZENE IN ALMOND OIL). 1.—Shake 2 or 3 Cc. of the oil with half its weight fused KOH—a reddish-yellow color develops, which quickly changes to green; on adding water a green layer separates and turns red within twenty-four hours. 2.—Dissolve 1 part oil in 12 of alcohol, add 9 KOH (? solut.)

and evaporate to about 14 parts—if oil pure, the residue is brownish-red, contains no crystals, and dissolves in water; with nitro-benzene it is crystalline and insoluble in water.

Maisch (QUININE). A voluminous crystalline but jelly-like ppt. is thrown down on adding a conc. solut. of an alkaline acetate to a solut. of quinine sulphate.

Maisch (TURMERIC IN RHUBARB). Shake rhubarb powder for one or two minutes with absolute alcohol, and filter off liquid; yellow filtrate is turned brown with conc. solut. of borax, and the color becomes only a little lighter on adding HCl, if turmeric present. With pure rhubarb, the acid at once changes the color to light yellow. See *Howie's* test.

Malassez (AMMONIA-CARMINE). See *Ranvier's* ammonia-carmine.

Malerba (ACETONE). Fluids (such as urine) containing acetone are colored red by dimethyl-paraphenylene-diamine solut. The spectrum of the red solut. is similar to that of oxyhemoglobin.

Mallet (MINERAL ACIDS IN VINEGAR). Add solut. sodium salicylate to vinegar—if considerable mineral acid present, salicylic acid will ppt. out. With very small quantities of acids, however, no ppt. forms.

Maly (BILIRUBIN). Bromine gives colors similar to those afforded by HNO_3 in Gmelin's test (*q. v.*).

Maly (FREE HYDROCHLORIC ACID IN GASTRIC JUICE). Violet color of methylene blue is changed to green.

Maly (URIC ACID). Dilute, faintly alkaline solut. of a urate remains clear on adding ammoniacal $AgNO_3$. On adding an ammoniacal magnesia solut., however, a flocculent or gelatinous ppt. forms.

Mandel (PRECIPITANT FOR PROTEIDS). A 5-% solut. chromic acid forms a delicate reagent for albuminoids; a turbidity results with a dilution of 1 part albumin in 50,000 parts water. If solut. first acidulated with acetic or citric acid, the ppt. subsides very rapidly. A 10-% solut. chromic acid may be used instead of nitric acid for Heller's zone reaction for albumin. See also *Zuelzer's* test.

Mandelin (ALKALOIDS). Solut. of 1 Gm. ammonium vanadate in 200 Cc. conc. H_2SO_4. Reagent yields brown, red, or green colors with alkaloids.

Mandelin (STRYCHNINE). Mix little strychnine in a watch-glass with a few drops 1-% solut. sodium vanadate in conc. H_2SO_4. On appearance of a dark color, tilt glass to allow fluid to run off—residue develops a beautiful blue color, changing to vermilion and reddish-yellow. On addition of a little alkali a permanent pink to purple color develops.

Manfredi (GOLD METHOD). Treat fresh tissues with 1-% solut. gold chloride for 30 minutes, then with 0.5-% oxalic-acid solut.; warm in water to 36° C., cool, and mount in glycerin.

Mangin (CELLULOSE). 1.—Microscopical section is first macerated in a solut. of iodine, 0.5; potassium iodide, 1.5; water, 100; and H_2SO_4 (2 volumes of conc. acid to 1 of water) is then added. Cellulose is indicated by a blue color. Section may be treated directly with one of the following solutions: (1) Zinc chloride, 20; iodine, 1.3; potassium iodide, 6.5; water, 10.5; or (2) with sat. calcium-chloride solut., 10; potassium iodide, 0.5; iodine, 0.1; or (3) with conc. phosphoric acid, 25; potassium iodide, 0.5, and a few crystals of iodine. 2.—Solut. of free iodine in iodic acid; section is dipped in water or alcohol, then dried, a few drops reagent added, and the preparation washed in water. Cellulose is colored black.

Mangini (ALKALOIDS). Potassium iodide, 3 parts; bismuth iodide, 16 parts; HCl, 3 parts. Reagent yields brown ppts. with solution of alkaloids. See *Dragendorff's* test. Above reagent has the advantage over the latter of not becoming turbid when mixed with water.

Mann (ALBUMIN FIXATIVE). Shake 1 volume egg albumin with 10 volumes distilled water, and filter twice through same paper. Spread filtered liquid on clear slides, which then leave to drain and dry. Float sections to be mounted in warm water (40° C.), arrange on slides passed beneath them, place slides for 5 minutes on a stove heated to 35° C., and then treat with xylene and alcohol.

Mann (OSMIC-ACID MIXTURE FOR NERVE CENTERS). Mix equal volumes 1-% solut. osmic acid and sat. solut. mercuric chloride in normal salt solut. (0.75-%).

Mann (PICRO-TANNIN MIXTURES). 1.—Dissolve 1 part picric acid with (or without) 1 part tannin in 200 parts sat. solut. mercuric chloride in normal salt solut. (0.75-%). 2.—Abso-

lute alcohol, 100 Cc.; picric acid, 4 Gm.; mercuric chloride, 15 Gm.; tannin, 6 to 8 Gm. 3.—Mercuric chloride, 12 Gm.; sodium chloride, 0.75 Gm.; picric acid, 1 Gm.; tannin, 1 Gm.; water, 1,000 Gm.

Mann (WATER IN ALCOHOL, AIR, ETC.) Triturate 1 part molybdic acid with 2 parts citric acid, fuse, and when cool dissolve in water. Saturate filter-paper with solut. and dry at 100° C. This blue paper becomes white on absorption of water when exposed to moist air, or when dipped into alcohol or ether containing water.

Mann-Hefelmann (FLUORINE IN BEER). See *Hefelmann-Mann.*

Manseau (CARBOLIC ACID). On addition of a few drops NH_3 to an alcoholic solut. of carbolic acid followed by adding tincture of iodine, the iodine disappears at first rapidly, then more slowly, and finally a greenish color is produced which remains even on heating or after the addition of HCl. Under similar conditions *beechwood creosote* and *guaiacol* give a brownish-green color (the more phenol the creosote contains the more distinctly green is the color); *thymol* gives a brick-red; *resorcin*, a color like that of old cognac; *naphtol*, a citron-yellow; *pyrocatechin*, a "catechu"; *pyrogallol*, a black; *hydroquinone*, a reddish-brown; *orcin*, a violet; *salicylic acid*, a yellowish-green, passing to brown, with the formation of a ppt. In presence of NaOH or KOH a yellowish, not green, color is produced, with formation of a ppt.

Mansier (CAMPHOR IN SPIRIT CAMPHOR). Add water to entirely ppt. camphor, then add conc. solut. chloral hydrate until camphor all redissolved. Quantity of solut. used is an index of the quantity of camphor present.

Marchand (CINCHONA ALKALOIDS). Note effects of nascent oxygen from lead peroxide and H_2SO_4. See *Am. Journ. Pharm.*, XVI, p. 198; XXX, p. 244.

Marchand (IODINE). A rose to violet color with dry starch, excess of HCl, and potassium bichromate results.

Marchand (OLIVE OIL). Note color reactions with H_2SO_4.

Marchand (ORGANIC MATTER IN WATER). Presence of suspended organic matter is revealed on placing the water in a flask surrounded by black paper in which two rectangular

apertures are cut so as to be opposite, and passing a beam of light through the water.

Marchand (STRYCHNINE). Triturate strychnine with H_2SO_4 containing 1% HNO_3, and add lead peroxide—a blue color develops which changes to violet, green, and yellow.

Maréchal (BILIARY PIGMENTS). Add 2 or 3 drops tincture of iodine to an acid or neutral urine—if biliary pigments present an emerald-green color appears. See *Smith's* test.

Mark (CHROMO-ACETO-OSMIC ACID). 7.5 parts 2-% chromic acid; 3.5 parts water; and 1 part glacial acetic acid. To 12 parts of this mixture add 8 parts 1-% osmic-acid solution.

Marmé (ALKALOIDS). Add to a boiling, conc. solut. of potassium iodide (4 parts KI in 12 parts of water), cadmium iodide to saturation (2 parts), and mix this with an equal volume of a cold, sat. solut. of KI. The conc. solut. is permanent; a weak one decomposes upon standing. With solutions of alkaloids, this reagent yields white to yellowish ppts. See *Dragendorff:* "Ermittelung der Gifte"; *Hager:* "Pharm. Praxis." Known also as *Lepage's* reagent. *Vervein* modifies this by dissolving potassium iodide, 10; cadmium iodide, 5; in distilled water, 100; five parts of the alkaloidal solut. slightly acidulated are shaken with 1 Cc. reagent.

Marmé (CADMIUM OR THALLIUM IN URINE). Potassium chlorate and HCl are added to the solut., which is then concentrated and electrolyzed. The metal deposited on the platinum terminal is washed and spectroscopically examined. It is usually well to examine both cathode and anode.

Marque (SPARTEINE). Sparteine sulphate warmed with one-third its weight of chromic acid yields a green color through reduction of the acid. The penetrating odor of cicutin is developed at the same time.

Marquis (MORPHINE). Reagent is a mixture of 10 Cc. H_2SO_4 and 10 drops of conc. oxymethylsulphonic-acid solution.

Marsh (ARSENIC) Arseniuretted hydrogen (arsine) is produced from solutions of arsenates or arsenites (which must, however, be free from oxidizing agents) by pure zinc and dil. H_2SO_4. If gas is passed through a red-hot glass tube, metallic arsenic is deposited on the cold portion of the tube beyond the heated part. Upon igniting the arsine and holding a cold porcelain

plate in the flame, metallic arsenic is deposited upon the plate. (Concerning further tests, distinction from antimony, and precautions to be observed in manipulation, see *Fresenius'* "Qualitative Analysis," and *Hager's* "Pharm. Praxis." *Davy's* modification consists in the use of sodium amalgam instead of zinc and H_2SO_4. In *Himmelmann's* modification, zinc, iron, and conc. ammonium-chloride solut. are used. In *Fleitmann's* modification, zinc and caustic soda or potassa liberate the gas.

Marsh (CHLORINE METHOD FOR BLEACHING SECTIONS). Generate chlorine from potassium chlorate and HCl, and pass gas to bottom of vessel containing sections immersed in water.

Marsh (DECALCIFICATION MIXTURE). Dissolve 15 Gm. pure chromic acid in 7 fl. oz. distilled water, and add 30 minims HNO_3. Macerate objects in this for 3 or 4 weeks, changing fluid frequently.

Marsh (GELATIN CEMENT FOR GLYCERIN MOUNTS). Soak ½ oz. Nelson's gelatin in water until swollen, then pour off excess of water, melt gelatin, and stir in 3 drops creosote. Use cement warm; when rings set quite hard and dry, paint over with solut. of 10 grains potassium bichromate in 1 fl. oz. water. Subsequent exposure to light renders the gelatin insoluble in water.

Marsh (INDICATOR). An infusion of dahlia petals, containing 4 fl. dr. H_2SO_4 and 2 grs. mercuric chloride to the pint, is neutralized with NH_3. Alkalies turn the infusion green, and acids change the color to red.

Martin (BENZOAZURIN STAIN). Immerse in a dil. aqueous solut. of benzoazurin for an hour or so, and wash out with 70-% alcohol acidulated with 0.5 to 1% HCl (sp. gr. 1.16).

Martin (NITRIC ACID). A solution of diphenylamine in H_2SO_4 and water gives a blue to black color when a liquid containing nitric acid is added drop by drop.

Martin (PEPTONES IN URINE). Ppt. proteids with ammonium sulphate, filter, and add to filtrate solut. copper sulphate and NaOH—rose-red color develops.

Martinotti (PICRO-NIGROSINE STAIN). Pathological objects are stained for 2 or 3 hours or days in a sat. solut. of nigrosine in sat. alcoholic picric-acid solut. Then wash out in a mixture

of 1 part formic acid with 2 parts alcohol until gray matter appears clearly differentiated from the white to the naked eye.

Martinotti-Resegotti (SAFRANINE METHOD). Sections of alcohol-fixed material, lightly stained with safranine are differentiated with a freshly prepared mixture of 1 part 0.1-% aqueous solut. chromic acid with 9 parts absolute alcohol, followed by pure alcohol and bergamot oil. Elastic tissue is fixed by Martinotti in a chromic liquid, washed, stained for 48 hours in Pfitzner's (5-%) safranine solut., again washed, dehydrated, cleared, and mounted in balsam. The elastic fibers are stained an intense black.

Maschke (CREATININE). Neutralize a creatinine solut. with Na_2CO_3, or dissolve creatinine in a cold, sat. solut. Na_2CO_3, and add a few drops Fehling's solut.—a white, amorphous, flocculent ppt. forms (more rapidly on heating).

Maschke (GLUCOSE IN URINE). Dissolve crystallized sodium tungstate 30, in 30-% acetic acid, 75, and water, 120. A black deposit forms on adding to urine containing glucose one-third its volume of the above solut., filtering if necessary, adding half the volume of conc. soda solut. and a small fragment of basic bismuth nitrate, then boiling.

Maschke (INDICATOR). An alcoholic solution of hematoxylin is changed from brownish-yellow to purplish-red by alkalies.

Maschke (MOLYBDENUM). A blue color develops on placing 2 drops of H_2SO_4 upon platinum foil, dusting upon the liquid a little of the powdered substance containing molybdenum, heating till vapors begin to escape, then cooling and breathing upon the foil.

Maschke (NITROUS ACID IN WATER). Bluish color developed on adding 6 to 10 drops dil. acetic acid, followed by 1 or 2 drops of blue molybdic-acid solut., disappears within an hour if nitrous acid present.

Maseau (PHENOL). On dissolving a few crystals phenol in 1 Cc. alcohol and adding a few crops NH_3 followed by an alcoholic solut. iodine, the latter is at first immediately decolorized, but later the solut. acquires a sea-green color, not destroyed by HCl or heat, but destroyed by HNO_3 and H_2SO_4. For details see MERCK'S REPORT, X, p. 365.

Masin (POTASSIO-MERCURIC IODIDE SOLUTION). Almost the same as *Mayer's* reagent (q. v.).

Massart (HEMATOXYLIN-EOSINE). See *Everard-Demoor-Massart.*

Masset (BILIARY MATTER). A grass-green color develops on adding 2 or 3 drops H_2SO_4 and a crystal of potassium nitrite to 2 Cc. of urine containing biliary matter. See *Gmelin's* test.

Massie (FIXED OILS). Note the color change on adding 5 Gm. HNO_3 to 10 Cc. of oil, and stirring with a glass rod for two minutes. Then add 1 Gm. mercury, stir a few times during three or four minutes, and note the color reactions.

Matthieu-Plessy (GLUCOSE; SUGAR; PYROGALLOL). Fuse together 54 parts ammonium nitrate, 34 parts lead nitrate, and 21 parts lead hydroxide. This mixture melts at 105° C., and affords with *glucose* a cherry-red color; with *cane suga* a yellowish-brown color; with *pyrogallol* a chrome-green color.

Maugin (TEXTILE FABRICS). Reagent for the microscopical examination of textile fabrics is an ammoniacal ruthenium oxychloride (ruthenium-red).

Mäule (LIGNIN). The section is soaked for about five minutes in a 1-% solut. of $KMnO_4$ in dist. water, and then washed with water. The section is then soaked for 2 to 3 minutes in dilute HCl; after again washing in water, a drop of dilute ammonia solut. is added to the section, when the lignified tissue becomes colored a deep red, the non-lignified remaining clear and colorless.

Maumené (DIFFERENTIATING OILS). The rise in temperature resulting when the oil and conc. H_2SO_4 are mixed, is observed. Drying oils evolve much more heat than non-drying ones.

Maumené (GLUCOSE). 1.—Saturate white woolen threads with a 33-% zinc-chloride solut. and dry. When moistened with a solut. glucose and heated to 130° C., the threads are colored brown or black. 2.—Heat glucose solut. with stannous chloride—a black-brown caramel-like ppt. forms.

Maupy (CASTOR OIL IN BALSAM COPAIVA OR CROTON OIL) Heat 10 Gm. suspected balsam or oil in a silver dish with excess dry KOH, and stir until volatile oils dissipated. If castor oil was present, odors of sebacic acid and caprylic alcohol are

noted, and two layers form, an upper resinous and a lower white fluid. The latter is boiled with 50 Gm. dist. water, and the solut. filtered. If any castor oil was present, sebacic acid separates on cooling.

Mayençon-Bergeret (ARSENIC). On exposing mercuric-chloride paper to arseniuretted hydrogen, it is colored lemon-yellow to light brown.

Mayer (ACID HEMALUM). See *Mayer's* Hemalum and Glychemalum.

Mayer (ACIDULATED ALCOHOL). Add 3 volumes of pure HCl to 97 volumes of 90-% alcohol in which is dissolved a small quantity of picric acid.

Mayer (ALBUMIN FIXATIVE FOR SLIDES). Shake well together 50 Cc. egg albumin, 50 Cc. glycerin, and 1 Gm. sodium salicylate, then filter.

Mayer (ALCOHOLIC CARMINE). 1.—Boil 100 Gm. alcohol with 1 or 2 drops HCl and an excess of carmine, until a clear solution is obtained, taking care that the carmine remains in excess. 2.—Boil carmine, 4 Gm., water, 15 Cc. and HCl, 30 drops, until the carmine is dissolved, then add 95 Cc. of 85-% alcohol and neutralize by adding NH_3 until the carmine begins to precipitate.

Mayer (ALKALOIDS). Solut. potassio-mercuric iodide. Dissolve 13.546 mercuric chloride and 49.8 Gm. potassium iodide in water and dilute to 1 liter. With most alkaloids in slightly acid solutions reagent yields whitish ppts. It may also be used in quantitative determinations. Reagent is also known as *Delf's*, *Planta's*, *Tanret's*, and *Winkler's* reagents.

Mayer (ALUMINIUM-CHLORIDE CARMINE). Dissolve 1 Gm. carminic acid and 3 Gm. aluminium chloride in 200 Cc. water.

Mayer (BERLIN-BLUE INJECTION). Add solut. of 10 Cc. tincture ferric chloride in 500 Cc. water to a solut. of 20 Gm. potassium ferrocyanide in 500 Cc. water, allow to stand for 12 hours, decant, wash deposit, for 1 or 2 days with distilled water, until washings come through dark blue, then dissolve the blue in about a liter water.

Mayer (BLEACHING METHOD). Place specimens in 70- to 90-% alcohol and add potassium chlorate in crystals until the bottom of the vessel is covered. Then add a few drops HCl and

warm if necessary until chlorine begins to be evolved. HNO_3 may be used instead of HCl, if desired.

Mayer (BLUING SECTIONS). After staining with hematoxylin, treat sections for a few seconds with 0.5- to 1-% potassium-acetate solut.

Mayer (BORAX CARMINE). See *Grenacher's* alcoholic borax-carmine.

Mayer (CARMALUM). Dissolve 1 Gm. carminic acid and 10 Gm. alum in 200 Cc. distilled water; decant or filter and add a few crystals thymol, 0.1% salicylic acid, or 0.5% sodium salicylate. A weaker solution contains 3 to 5 times as much alum and 5 times as much water.

Mayer (COCHINEAL STAINS). 1.—Macerate 1 Gm. cochineal in coarse powder for several days in 8 to 10 Cc. of 70-% alcohol, stirring frequently. Filter before use. 2.—Rub up in a mortar 5 Gm. finely powdered cochineal, 5 Gm. calcium chloride, and 0.5 Gm. aluminium chloride, then add 100 Cc. 50-% alcohol and 8 drops HNO_3 (sp. gr. 1.2), heat to boiling-point, cool, leave standing for some days, with frequent agitation, and filter. In using these stains, prepare and wash out objects with alcohol of the same strength as that with which stain is prepared.

Mayer (DESILICIFICATION PROCESS). Place objects in alcohol contained in a glass vessel coated internally with paraffin, then add hydrofluoric acid drop by drop until desilicification complete, avoiding the fumes.

Mayer (HEMACALCIUM). Rub up together 1 Gm. hematein or the ammonium salt (see below) and 1 Gm. aluminium chloride; add 10 Cc. glacial acetic acid and 600 Cc. 70-% alcohol, and finally 50 Gm. calcium chloride.

Mayer (HEMALUM AND GLYCHEMALUM). Hemalum is prepared by dissolving 1 Gm. of hematein or the ammonium salt (prepared by dissolving 1 Gm. of hematoxylin with the aid of heat in 20 Cc. distilled water, filtering if necessary, then adding 1 Cc. NH_3, sp. gr. 0.875, and evaporating at the ordinary temperature) in 50 Cc. of 90-% alcohol, and adding to a solut. of 50 Gm. alum in a liter distilled water. Allow to cool and settle, filter if necessary, and add a crystal of thymol to preserve from mold. *Mayer's* acid hemalum is the same with the

addition of 2% glacial acetic acid. Glychemalum is a mixture of 0.4 Gm. of hematein, 5 Gm. alum, 30 Gm. glycerin, and 70 Gm. distilled water. The hematein is first dissolved in a few drops glycerin.

Mayer (INDIGO-CARMINE WITH CARMINE OR HEMATEIN). Dissolve 0.1 Gm. indigo carmine in 50 Cc. distilled water or 5-% alum solut., and combine with 4 to 20 volumes carmalum or hemalum.

Mayer (MUCICARMINE FOR STAINING MUCUS). Heat for 2 minutes, in a capsule over a small flame, 1 Gm. carmine with 0.5 Gm. aluminium chloride and 2 Cc. distilled water. Stir thoroughly until mixture becomes dark and thick, then add a little 50-% alcohol to dissolve the warm mass, and make up with the alcohol to 100 Cc. Stand for 24 hours and filter.

Mayer (MUCIHEMATEIN FOR STAINING MUCUS). Mix 0.2 Gm. hematein with 40 Cc. glycerin, 1 Gm. aluminium chloride, and 60 Cc. water. Rub up hematein with a few drops glycerin first. An alcoholic solut. may be prepared by dissolving hematein and aluminium chloride in 100 Cc. 70-% alcohol, with or without addition of 2 drops of HNO_3.

Mayer (PARACARMINE). Dissolve 1 Gm. carminic acid, 0.5 Gm. aluminium chloride, and 4 Gm. calcium chloride in 100 Cc. of 70-% alcohol. Allow to settle and filter.

Mayer (PICRO-HYDROCHLORIC ACID). Mix 100 volumes distilled water with 5 volumes HNO_3 (of 25-% N_2O_5), and saturate with picric acid.

Mayer (PICRO-NITRIC ACID). Mix 100 volumes distilled water with 5 volumes HNO_3 (of 25-% N_2O_5), and saturate mixture with picric acid.

Mayer (PICRO-SULPHURIC ACID). Mix 100 volumes distilled water with 2 volumes H_2SO_4, and dissolve in the mixture 0.25% picric acid, or enough to saturate.

Mayer (SHELLAC FIXATIVE). Heat powdered white shellac with crystallized carbolic acid till it dissolves, and filter warm solut. Or coat warm slides with a thin and even film of a moderately strong solut. brown shellac in absolute alcohol, and allow to dry. Sections are arranged on the dry film and gently pressed down on it, then exposed to vapor of ether. See *Giesbrecht's* method.

Mayrhofer-Donath (GLYCERIN). See *Donath-Mayrhofer.*

Maysel (BISMARCK-BROWN STAIN). Dissolve dye in acetic acid. According to Lee, solut. does not give a permanent stain.

Mazzara (GLUCOSE). A green ppt. forms on heating the liquid with nickel chloride in presence of a little KOH.

McClellan Forney (ALCOHOL AND TURPENTINE IN ESSENTIAL OILS). Mix five drops of the oil with 1 drop iodine pentabromide. For details see *Am. Journ. Pharm.*, 1882, p. 546.

Mecke (ALKALOIDS AND GLUCOSIDES). Solut. of selenous acid 1, in conc. H_2SO_4 200, gives various color reactions with alkaloids and glucosides when used hot or cold, as follows: *Aconitine*, amorph—cold, colorless, or yellowish; hot, light brownish-violet. *Aconitine*, cryst.—cold or hot, colorless. *Apomorphine*—cold, dark bluish-violet; hot, gradually dark-brown. *Atropine*—hot or cold, colorless or almost so. *Brucine*—cold, yellowish-red; hot, lemon-yellow. *Caffeine*—cold or hot, colorless. *Cocaine*—cold, colorless; hot, reddish-yellow. *Codeine*—cold, blue, changing to emerald-green and olive; hot, steel-blue, then brown. *Colchicine*—cold, lemon-yellow; hot, yellowish-brown. *Coniine*—cold or hot, colorless. *Delphinine*—cold, deep reddish-brown; hot, brown. *Digitalin*—cold, yellow, then red, gradually fading; hot, bluish-violet, then brown. *Morphine*—cold. blue, then bluish- or olive-green; hot, brown. *Narceine*—cold, faint greenish-yellow, then violet; hot, dark-violet. *Narcotine*—cold, greenish steel-blue, then cherry-red; hot, cherry-red. *Nicotine*—cold or hot, yellowish. *Papaverine*—cold, greenish steel-blue, then violet; hot, dark-violet. *Physostigmine*—cold, brownish-yellow; hot, faint brownish-red. *Picrotoxin*—cold, almost colorless; hot, yellowish-brown. *Quinine*—cold, colorless; hot, light-brown. *Solanine*—cold, reddish-yellow; hot, grayish-brown. *Strychnine*—cold or hot, colorless. *Thebaine*—cold, deep orange, gradually paling; hot, dark-brown. *Veratrine*—cold, lemon-yellow then olive-green; hot, brownish-violet.

Medicus (SALICYLIC ACID IN MILK). Add NaOH to the milk, and shake out fat with ether. Acidulate with HCl, and shake out again with ether, which removes the salicylic acid, then readily recognized by ferric chloride and other usual reactions.

Mehu (ALBUMIN). In applying this test add 1 Cc. reagent (phenol 1, acetic acid 1, 90-% alcohol 2) to 10 Cc. liquid, after adding 5 Cc. of crude HNO_3; then shake well and allow to deposit. The acid may be advantageously replaced by 5 Cc. of sat. sodium-sulphate solut. A flocculent ppt. is thrown down.

Mein (ABSINTHIN). Dissolves in H_2SO_4 with a brownish color, which soon turns greenish-blue and becomes dark-blue on adding water.

Melassez (SOLUTION FOR PREPARING TEICHMANN'S HEMIN CRYSTALS). Fluid having the specific gravity of blood (1.050 to 1.057); consists of 3.75 parts mucilage of acacia, 1.875 parts sodium sulphate, 1.03 parts sodium chloride, and 100 parts water.

Meldola (NITROUS ACID). A solut. of 0.5 Gm. para-amidobenzene-azodimethyl aniline in 1 liter of dil. HCl. A few drops added to fluid to be examined, followed by a few drops HCl and subsequently by NH_3, develops a blue color in presence of nitrites; reagent keeps well for an indefinite period, contrasting in this respect favorably with Griess phenylenediamine solut.

Melzer (ALKALOIDS, GLUCOSIDES, ETC.). Add 1 drop 20-% solut. benzaldehyde (in absolute alcohol) to trace of substance in watch-glass standing on white paper, and then add 1 drop conc. H_2SO_4. Following color reactions are obtained: *Picrotoxin*—violet-red, first seen as bands of color, on adding water color disappears; *colchicine* and *cantharidin*—no characteristic color, but simply yellow solution; *digitalin*—unsightly yellowish-brown color, and the particles become brown; *coniine*, *nicotine*, *brucine*, *strychnine*, *papaverine*, *narcotine*, *atropine*, *hyoscyamine*, *narceine*, *cocaine*, and *aconitine* (in small quantity) —no characteristic reactions. With considerable aconitine results like those of digitalin are obtained: *veratrine*—color like that given by H_2SO_4 alone; *codeine*—yellowish to blood-red color; *thebaine*—particles present appearance of dark-brown specks; *delphinine*—reddish-brown striæ; *emetine*—small traces no characteristic reaction, but large traces dark-brown striæ; *apomorphine*—almost no color; *morphine*—red or yellowish-red striæ or colors.

Mene (PHENOL). Bromine water gives a yellowish-white ppt. with carbolic acid.

Merck (OPIUM). Treat with KOH solution and shake with ether, then dip a strip of filter paper into ethereal solut., moisten with HCl, and expose to vapor of boiling water. The paper should then turn red.

Merget (MERCURY). 1.—Expose a strip of filtering paper moistened with ammoniacal silver-nitrate solut. and dried, to mercury vapor, which produces a black stain. 2.—Dip a copper wire in the liquid containing mercury, dry with filter-paper, and wrap up in tissue paper moistened with ammoniacal silver-nitrate solut. The mercury produces a black stain in this case also. 3.—A piece of gold-foil upon which metallic mercury has been ppt. by stannous chloride from urine containing corrosive sublimate, is wrapped up first in tissue paper, and then in filter-paper that had previously been saturated with an ammoniacal silver solut. and dried. If mercury present a brown color develops in a few minutes on the inside of the filter-paper. To detect presence of mercurial vapor, lines are drawn on filter-paper with a glass rod moistened with an ammoniacal silver-nitrate solut. These are darkened by mercurial vapor.

Merget (MOISTURE). Test depends upon the use of salts which, like palladious chloride and mercurous chloride, show different colors when moist or dry. See *Mann's* test.

Merget (TEST-PAPER FOR CARBON MONOXIDE, OZONE, ETC.). Paper impregnated with palladious-chloride solut. (containing 5% metallic Pd) gives a black color with carbon monoxide, H_2S, ozone, methane, ethane, and illuminating gas.

Merkel (CHROMIC ACID AND PLATINIC CHLORIDE). Mix equal volumes of 1:400 solut. chromic acid and 1:400 solut. platinic chloride. Objects are left in this for several hours or days to harden, then washed in 50- to 70-% alcohol.

Merkel (FIXING SOLUTION). Chromic-acid solut. 0.25-%, 1 part, platinum-chloride solut. 0.25-%, 1 part. The solut. takes a long time to act, but the preparations stain well.

Mermet (CARBONIC OXIDE). The following solutions must be freshly prepared: *a*.—Silver nitrate 2 or 3 Gm., water 1,000 Cc. *b*.—A few drops HNO_3 (free from HCl or chloride) added

to 1 liter boiling water, then permanganate solut. added until permanent red color. In this, after cooling, 1 Gm. permanganate is dissolved. Reagent is prepared by mixing 20 Cc. *a* with 1 Cc. *b* and 1 Cc. HNO_3, and diluting with distilled water to 50 Cc. Reagent is decolorized by CO and by H_2S.

Mermet (SULPHOCARBONATES). Diluted (almost colorless) ammoniacal solut. nickel sulphate or chloride gives a currant-red color with sulpho-carbonates.

Merz (FIXED OILS). On mixing an adulterated oil with an equal volume pure oil and gently shaking, the mixture appears streaky.

Merz (OLIVE OIL). One of two samples of olive oil is heated to 250° C. The heated sample, if pure, will appear much paler than the other.

Merz (PHOSPHORIC ACID). Place a drop of liquid containing free phosphoric acid (or a little of dry substance mixed with H_2SO_4) in a loop of platinum wire, and hold close to lower part of a hydrogen flame—latter is colored green.

Merz (TURPENTINE IN ESSENTIAL OILS). Pure oils become milky on shaking with an equal volume poppy-seed oil, but remain clear if they contain turpentine.

Mesnard (ALBUMINS). Treat with glycerin containing sugar, and expose to fumes from conc. HCl.

Messinger (ACETONE). Solutions containing acetone yield iodoform on treatment with iodine and NaOH. For quantitative estimation, either the iodoform is weighed (*Kramer*), or the excess of iodine titrated (*Messinger*).

Metzger (COCAINE). Dil. aqueous solutions of cocaine salts after acidulating with HCl yield orange-yellow ppts. with potassium chromate.

Meyer (COD-LIVER OIL). Pure cod-liver oil when shaken with $\frac{1}{10}$ its volume of a mixture of HNO_3 and H_2SO_4 (1 : 1), is first colored rose-red, then lemon-yellow. Other fish oils either do not exhibit the color so clearly, or yield a brownish-violet color.

Meyer (FURFUROL IN GLACIAL ACETIC ACID). Add a few drops solut. $AgNO_3$ and warm on water-bath for ¼ hour—if furfurol present, metallic Ag. pptd. A trace of furfurol does not, however, give the reaction.

Meyer (SALICYLIC VINEGAR). A solut. of 1 part salicylic acid in 100 parts pale-yellow pyroligneous acid (sp. gr. 1.04). For preserving various larvæ, hydræ, nematodes, etc., add 1 volume salicylic vinegar to 10 volumes dil. glycerin (glycerin 1 vol., water 2 vols.). For infusoria the glycerin should be more dilute (1 to 4 of water).

Meyer (THIOPHENE). Thiophene and its homologues yield a blue color with a solut. of isatin in conc. H_2SO_4.

Mezger (COCAINE). See *Metzger's* test.

Mialhe (CRUCIFEROUS OILS). Saponify cruciferous oils with potassa solut. and filter. On adding $AgNO_3$ to filtrate, latter acquires a black color.

Michailow (PROTEIDS). Add ferrous sulphate to solut. of substance, and overlay on conc. H_2SO_4. On adding very little HNO_3 the familiar reddish-brown zone develops, as well as a blood-red color, if proteids present.

Millard (ALBUMIN IN URINE). Overlay urine on a mixture of phenol (95-%) 2 fl. dr.; acetic acid, 7 fl. dr.; and KOH solut. 22 fl. dr.—a ppt forms.

Millard (PODOPHYLLUM RESIN). 1.—Resin of Indian podophyllum (*P. emodi*) gives an orange-red color when particles are sprinkled on conc. H_2SO_4 placed on a white surface; American podophyllum (*P. peltatum*) gives a yellow to brown color according to quantity used. 2.—Add 3 Cc. dil. alcohol (sp. gr. 0.920) and 0.5 Cc. potassa solut. (B.P.) to 0.4 Gm. resin in a test-tube and rotate latter gently—with Indian resin the mixture forms a semi-solid gelatinous mass in a few seconds. It may be necessary to heat mixture to boiling-point and to cool before gelatinization takes place. American resin, similarly treated, does not gelatinize, even after some days.

Miller (INDICATOR) Tropæolin, or methyl-orange. Changed by mineral acids from yellow to crimson; indifferent to CO_2 and H_2S.

Miller, Von- (HYDROCHLORIC ACID IN GASTRIC JUICE). See *Luttke's* test.

Millian (LINSEED OIL IN OLIVE OIL). Mix 40 Gm. olive oil with 60 Gm. of a 20-% KOH solut. in 70-% alcohol, and heat on water-bath until alcohol has evaporated. Dissolve resulting soap in warm water, separate fatty acids by adding dilute

HCl, and dissolve in 20 Cc. 90-% alcohol. If, to this solut., after heating to 90° C., 2 Cc. of 3-% alcoholic $AgNO_3$ solut. are added, a brown color results, if linseed oil present.

Millian. Modification. of *Bechi's* test (q. v.).

Millon (ALBUMINS AND PHENOLS). Dissolve mercury in an equal weight cold fuming HNO_3 (sp. gr. 1.4), then apply moderate heat, and dilute solut. with two volumes water. Reagent contains mercurous and mercuric nitrates, as well as free nitric and nitrous acids. Albumins yield a brick-red ppt. with reagent, particularly on warming. Similar reactions also given by all compounds of the aromatic series containing one hydroxyl or methoxyl group; a second hydroxyl or a nitro group in the ring changes the reaction (*Nickel*). Thus *resorcin* yields a yellow, *hydroquinone* an orange, and *pyrogallol* a brown, color. *Tannin* and *guaiacol* yield red, *eugenol* and *vanillin* a violet, color. *Kintschgen-Gintl's* modification: Add a little potassium nitrate to a solut. of mercuric nitrate, and add the necessary quantity of HNO_3 just before using. The potassium nitrate must be freed from any carbonate it may contain (by treatment with nitrous acid). See also *Gallois'*, *Hoffmann's*, *Almen's*, and *Plugge's* tests.

Millon (PARAOXYPHENYLACETIC ACID). Boil solut. with mercuric nitrite and potassium nitrite—if paraoxyphenylacetic acid present an intense red color develops.

Millon (SALICYLIC ACID). A 10-% mercuric-nitrate solution in diluted HNO_3 yields an intensely red color with salicylic acid.

Minot (MACERATION METHOD FOR EPITHELIUM). Macerate embryos for several days in 0.6-% salt solut., containing 0.1% thymol.

Minovici (PICROTOXIN). Add 2 drops H_2SO_4 to substance or to 2 or 3 drops of dil. solut. of latter, and a minute later add 1 drop of 20-% alcoholic solut. anisic aldehyde. Picrotoxin in substance gives with the H_2SO_4 a saffron color, and on adding the anisic aldehyde the particles are surrounded by an indigo-violet zone gradually changing to blue. On heating on water-bath to 80° C., a 1:1000 solut. gives a deep-red color; a 1:1500 solut. gives a still visible reddish-violet to pale-red.

Miquel (CULTURE SOLUTION). Peptone, 20; sodium chloride, 5; wood ash, 0.1; water, 1000.

Mitrophanow (GOLD PROCESS FOR PRICKLE-CELLS AND INTERCELLULAR CANALS). Wash the tail of an axolotl larva with distilled water, place for an hour in a watch-glassful of 0.25-% solut. of gold chloride containing 1 drop HCl; wash, and reduce in a mixture of 1 part formic acid with 6 parts water.

Mitrophanow (MACERATION METHOD FOR EPITHELIUM). Fix the embryo for 15 minutes in 3-% HNO_3; then place for an hour in a mixture of alcohol, 1 volume, and water, 2 volumes, and finally treat with stronger alcohol for 24 hours to separate the epidermis.

Mitscherlich (PHOSPHORUS). Acidulate aqueous liquid with H_2SO_4 and distil, conducting vapors through a glass tube surrounded by a condenser. In a dark room, a luminosity is observed. If alcohol, ether, or oil turpentine present, luminosity does not appear. Salts of mercury and iodine, and metallic sulphides also, interfere with luminosity.

Mobin (MACERATING MEDIA). 1.—1 part sea-water with 4 to 6 parts 0.5 % solut. potassium bichromate. 2.—Sea-water containing 0.25% chromic acid, 0.1% osmic acid, and 0.1% acetic acid. Lamellibranchiata should be macerated in No. 2 for several days.

Moddermann (AMMONIA). A very dilute solut. copper sulphate becomes turbid on adding NH_3.

Moer, van de- (CYTISINE). A 0.5-% solut. ferric chloride and 0.05-% solut. H_2O_2 gives first a red, then blue color with cytisine.

Moerner (ACETONE). Urine containing acetone, heated with a little of KI solut. and excess of ferric chloride yields intensely irritating vapors.

Moers (ACETANILID; CITROPHEN; EXALGIN; METHACETIN; PHENACETIN). On adding a trace of one of these substances to 1 Cc. NaOH solut. followed by a drop of 1:1000 potassium-permanganate solut., a violet color develops, passing through blue and green; on adding excess of H_2SO_4, color changes to red and slowly disappears. With citrophen color changes through violet, blue, and green so rapidly that only the last is generally observed. With centi- or deci-normal solut. NaOH color changes are immediate with citrophen, phenacetin, and methacetin; after a time with acetanilid and exalgin. If

Na_2CO_3 used instead of NaOH, citrophen reacts at once; phenacetin and methacetin slowly; acetanilid and exalgin, not at all. With $NaHCO_3$ citrophen alone reacts, color being reddish-brown, changed by acids to violet. In acid solut., citrophen alone gives color reaction.

Mohler (TARTARIC ACID). If a little tartaric acid or a tartrate be heated with a few drops solut. of resorcin 1 in conc. H_2SO_4 100, until H_2SO_4 vapors develop, the fluid acquires a fine wine-red color; the smallest trace of tartaric acid is sufficient.

Mohr (ANTIMONOUS ACID). Dissolve the acid, or any of its compounds, in an aqueous solut. tartaric acid, neutralize excess of acid with Na_2CO_3, then add a cold sat. solut. $NaHCO_3$ in the proportion of 10 Cc. to each 0.1 Gm. of Sb_2O_3. The clear solut. is titrated with decinormal iodine with starch indicator. The titration must be conducted immediately the solution of bicarbonate has been added. 1 Cc. decinormal iodine = 0.006 Gm. antimony.

Mohr (CHLORIDES). This is the familiar volumetric process with decinormal silver nitrate, using potassium chromate as indicator.

Mohr (FREE MINERAL ACIDS). 1.—Add a few drops of potassium-sulphocyanide solut. to a light-yellow solut. ferric acetate, free from alkaline acetates. Traces of mineral acid turn the mixture blood-red, but the color disappears on adding excess of sodium acetate. 2.—KI starch paste, with a light-yellow solut. of ferric acetate, is turned red by traces of mineral acid. 3.—On adding cane sugar to a solut. containing H_2SO_4, and evaporating to dryness on a water-bath, a blackened residue is left.

Mohr (GLUCOSE). See *Moore's* test.

Mohr (HYDROCHLORIC ACID IN GASTRIC JUICE). 20 Cc. 10-% potassium-sulphocyanate solut. with 5 Cc. 5-% ferric-acetate solut. HCl, with this reagent, yields a cherry-red color with a brownish tinge; much acid causes a chestnut-brown color. Also known as *Rheoch's* test.

Mohr (NITRO-GLYCERIN). A purple to dark-green color develops on extracting with ether or chloroform, mixing with a few drops of aniline, evaporating, and adding a few drops H_2SO_4.

Mohr (POTASSIUM SALTS). A sat. solut. of potassium and sodium acid tartrates precipitates potassium salts from neutral solutions.

Mohr (SOLUTION). The potassium-permanganate solut. generally used in volumetric analysis.

Moleschott (POTASSA AND SODA SOLUTIONS). Strong solutions (35- to 50-%) are applied to the tissues on slides, and the alkali neutralized by adding acetic acid before mounting. See *Gage's* preservative.

Moleschott (CHOLESTERIN). On allowing H_2SO_4 to come in contact with substance under the microscope, the plates lose their form, and their margins become colored carmine-red, changed to violet on adding aqueous solut. iodine.

Moleschott-Piso Borme (SODIUM CHLORIDE AND ALCOHOL). Mix 5 volumes 10-% salt solution with 1 volume absolute alcohol.

Molher (REAGENT). See *Gayon-Ganon-Molher's* test.

Molisch (CARBOHYDRATES). ½ to 1 Cc. of solut. to be tested is shaken with 2 drops 15- to 20-% alcoholic solut. of alpha-naphtol or thymol. Upon adding an equal volume conc. H_2SO_4, a violet color ensues (furfurol reaction) in presence of carbohydrates (and various other substances). Addition of water causes a bluish-violet ppt., soluble in alcohol, ether, or potassa lye, with yellow color.

Molisch (INDICAN IN PLANTS). Boil plant fragments ½ minute with dil. NH_3 ($2NH_3+98$ water), filter, cool, and shake out with chloroform. Carry out similar process using 2-% HCl. If indican present, chloroform layer in one or both cases acquires a blue or violet color.

Molisch (WOOD PULP). To a 20-% solut. of thymol in absolute alcohol, add water until no more thymol separates. Set aside solution for some hours with excess of potassium chlorate, then filter. Paper made with wood pulp moistened with this solution gives a bright-blue color on the addition of a drop of conc. HCl.

Monier (ALBUMIN). 1.—On adding albumin to a starch solut. colored blue by a few drops tincture iodine, the color is discharged. 2.—Add a few drops iodine solut. to a solut. containing albumin, and heat—a colorless coagulum forms.

Monsel (SOLUTION). Solut. iron subsulphate.

Moore (ANISE-OIL IMBEDDING PROCESS). Sections from material frozen and cut in anise oil are transferred direct into Canada balsam, without previous treatment with alcohol.

Moore (GLUCOSE AND SUGAR IN URINE). Heat glucose solutions or diabetic urine with potassa—a brown color ensues, and, after acidifying, odor of caramel supervenes. Also known as *Mohr's* or *Pelouze's* test. See also *Heller's* test.

Moore (STAIN FOR BLOOD). Stain for 3 minutes in an alcoholic solut. eosine (1 : 200), wash, and stain for 2 minutes in a 1-% aqueous solut. of methyl green. Red corpuscles appear red; nuclei and white corpuscles bluish-green.

Moore-Heller (GLUCOSE). Like *Moore's* test (q. v.).

Morax (STAINING FLAGELLA). See *Nicholle-Morax's* method.

Morgan (MERCURY). A silvery stain appears on placing 2 drops of the liquid on a piece of bright copper, and adding strong KI solut.

Morpurgo (NITROBENZENE). Carefully heat to boiling in a porcelain dish 2 drops liquefied phenol, 3 drops water, and a small piece KOH, then add liquid to be examined. On prolonged boiling a crimson ring appears at margin of liquid. If satur. solut. chlorinated lime be added, ring becomes emerald-green. To detect nitrobenzene in soap, dissolve latter in water, mix with excess milk-of-lime, extract with ether, and proceed as above.

Morpurgo (SUCROL OR DULCIN IN BEVERAGES). Add to liquid $\frac{1}{20}$ of its weight lead carbonate, and evaporate on water-bath to thick paste, which exhaust several times with alcohol. Evaporate alcoholic extract to dryness, and exhaust residue with ether. Pure sucrol or dulcin may be recognized on evaporating ether by (1) physical properties and sweet taste; (2) by heating a short time with 2 drops phenol and 2 drops conc. H_2SO_4, adding a few Cc. water, and allowing a little NH_3 or NaOH to flow on cold mixture in a test-tube, when a blue or violet-blue zone forms.

Morrell (LINSEED OIL). Pure oil is colored sea-green to greenish-yellow on mixing 10 parts by weight with 3 of crude HNO_3 and allowing to stand for a time. Adulterated oil assumes a light-yellow color.

Morson (CREOSOTE: PHENOL). Creosote is insoluble in glycerin; phenol is soluble.

Morton (ARSENIC). Solut. is placed in an apparatus similar to Doebereiner's lamp and an electric current passed through to decompose the water, thus replacing the Zn and H_2SO_4.

Motten-Lindemann (ALKALOIDS; SACCHARIN). See *Lindemann-Motten.*

Mueller (ACETANILID [ANTIFEBRIN] IN URINE). Boil urine with ¼ volume HCl, cool, add a few Cc. 3-% solut. phenol, and a drop solut. chromic acid (or, calcium- or ferric chloride)—a red color develops, turned blue by NH_3 (paramido-phenol reaction).

Mueller (BERLIN BLUE FOR INJECTIONS). Ppt. a conc. solut. of Berlin blue by means of 90-% alcohol. The ppt. is very finely divided, while the fluid is perfectly neutral and much easier to prepare than that of *Beale.*

Mueller (CAUSTIC SODA IN CARBONATE). In the presence of caustic soda, potassium permanganate solut. turns green.

Mueller (CYSTIN). Dissolve cystin (from the urine sediment) in warm potassa lye, dilute solut. with water, and add sodium nitroferricyanide—a purple-violet color develops.

Mueller (HARDENING FLUID). 2 Gm. potassium bichromate; 1 Gm. sodium sulphate; 100 Cc. water. This solution is sometimes mixed with one-third its volume of 90-% alcohol, its hardening action being then much more rapid.

Mueller (HYDROGEN SULPHIDE IN URINE). 1.—Pass current of air through urine and against filter-paper dipped in alkaline solut. lead acetate—paper is blackened. 2.—Overlay urine on a mixture of HCl and paramidodimethylamine containing 1 or 2 drops dilute solut. Fe_2Cl_6—a blue zone forms.

Mueller (SILVER STAINING METHOD). Impregnate preparations by immersion in the dark for 2 or 3 minutes in a 1-% solut. $AgNO_3$, then add to the liquid a small quantity of 1-% solut. silver iodide dissolved by the aid of a little KI. After agitation in the mixture, wash the preparations with distilled water, and expose to light for 2 days in a 1-% solut. $AgNO_3$.

Mueller-Ebstein (PYROCATECHIN). See *Ebstein-Mueller.*

Muir (BISMUTH). A brownish-black ppt. is thrown down on heating with a solut. of stannous chloride, 1, and tartaric acid, 3, in sufficient KOH solut.

Mukerji (FREE PHOSPHORUS). Operation consists in evolving hydrogen phosphide, and observing the glow in a dark room. For details, see MERCK'S REPORT, IX, p. 561.

Mulder (GLUCOSE). Heat diabetic urine, or solut. containing glucose, with a solut. of indigo in H_2SO_4, then carefully neutralize with Na_2CO_3—the color changes through green into red, and finally yellow, from reduction of the indigo. On exposure to the air, the blue color is restored. According to *Vogl's* modification, litmus is used instead of indigo; *Neumann-Wender's* test (q. v.) is a methylene-blue solut.

Mulder (XANTHOPROTEIN). Upon boiling an albuminous substance with conc. HNO_3, it is partially or completely dissolved, forming a yellow solut. Albumoses and peptones yield this color even in the cold. Upon supersaturating with NH_3 or fixed alkalies, color changes to orange-yellow.

Mulliken-Scudder (METHYL ALCOHOL). Heat a spiral of light copper wire in upper part of a Bunsen flame (to oxidize it), and while red hot, dip into 3 Cc. alcoholic solut. in a test-tube. Repeat once or twice. Then add to solut. 1 drop 0.5-% solut. resorcin, and overlay mixture on conc. H_2SO_4. If methyl alcohol is present, a rose-red zone forms. For details, see MERCK'S REPORT, VIII, p. 164.

Munk (HEMAPHEINIC URINE). Greenish rhubarb- and senna urines (*a*), and santonin urine (*b*), give following reactions: Alkalies—(*a*) and (*b*), red. Alkali carbonates—(*a*), immediate, permanent red; (*b*), red slowly forming and gradually disappearing. Zinc dust—with (*a*), red developed by alkali is discharged, but with (*b*), not discharged. Baryta solut. or milk-of-lime—(*a*), on shaking with excess, gives a colored ppt. and colorless filtrate; (*b*) gives a colorless ppt. but colored filtrate.

Munk (SULPHOCYANIC ACID IN URINE). Acidify 200 Cc. urine with HNO_3, add solut. $AgNO_3$, filter, decompose filtrate with H_2S, distil, add ferrous sulphide (containing iron oxide) and NaOH, warm, then add HCl—Prussian blue forms.

Munson (CHLORAL-HYDRATE SOLUTION). A 1-% solut. in water.

Musculus (FERMENT PAPER FOR UREA). Decomposing urine is filtered, the filter washed, colored with curcuma, and preserved as test-paper. When brought into contact with a urea-

solution, the attached ferment decomposes the urea, and the resulting ammonium carbonate changes the curcuma coloring matter to brown.

Muter (FATTY OIL IN COPAIVA BALSAM). Saponify 3 or 4 Gm. balsam with 5 Gm. NaOH and 50 Cc. alcohol on water-bath, add sufficient water, and concentrate to 100 Cc. Then add dil. H_2SO_4 to permanent turbidity, next add NaOH until just clear. Now evaporate to dryness under constant stirring, and exhaust residue with 3 portions of 70 Cc. each of ether-alcohol. The residue will now consist of Na_2SO_4 only, if no fatty oil was present; otherwise it will contain sodium oleate. Dissolve residue in warm water, acidulate with HCl, and cool. If balsam pure, only a few resinous flakes observed; if fatty oil was present, an oily layer forms.

Mylius (BILIARY ACIDS). In this modification of Pettenkofer's reaction, one drop of furfurol solut. and 1 Cc. of conc, H_2SO_4 are added to each Cc. of the alcoholic solut. of the biliary acid, cooling if necessary. The resulting red color is permanent for some time, changing gradually to violet. See also *Udransky's* modification of Pettenkofer's reaction.

Nadler (MORPHINE). 1.—A greenish-blue color develops on making a liquid containing morphine strongly alkaline, and boiling with barely sufficient solut. copper ammonio-sulphate to color it light blue. 2.—A rose-red color develops on heating morphine with a few drops H_2SO_4 diluted with half its volume water, cooling, adding NH_3 in excess, again cooling, and shaking with chloroform.

Nagelvoort (PILOCARPINE NITRATE). Dissolve 0.005 Gm. to 0.01 Gm. salt in 5 Cc. water, add a few drops NH_3 and shake out with 10 Cc. chloroform. When both fluids clear, draw off chloroform and evaporate. Mix residue with 0.01 Gm. calomel by stirring with a glass rod—characteristic black color reaction appears, even without blowing over mixture, because pilocarpine is very hygroscopic.

Napier (WATER IN ETHER). Paper impregnated with cobalt chloride is changed from blue to rose-red.

Naschold (DIFFERENTIATING ANILINE BLUE FROM INDIGO CARMINE). Boil with 10-% soda lye and make acid with HCl

—blue color which had disappeared is restored with aniline blue; with indigo carmine the liquid remains colorless.

Naylor-Braithwaite (ARSENOUS ACID). *a.*—Copper sulphate, 200 Gm.; water, 50 Cc. *b.*—Sodium tartrate, 0.5 Gm.; caustic soda, 5 Gm.; water, 50 Cc. Mix the two soluts. when required for use. Arsenous acid reduces this reagent.

Neelsen (CARBOLFUCHSINE). Solut. for identifying tubercle bacilli in sputum is prepared by adding a conc. alcoholic fuchsine-solut. to a 5-% aqueous carbolic-acid solut. (5 Gm. crystallized acid in 100 Cc. water, and 1 Gm. fuchsine, dissolved in 10 Gm. alcohol, added). *Ehrlich's* and *Ziehl's* carbolfuchsine solutions are similar.

Neelsen (BACILLI). See *Ziehl-Neelsen's* method and solution.

Neisser (GONOCOCCUS STAIN). Float preparation first on conc. alcoholic solut. eosine, which is then heated. Remove excess of eosine from cover-glass with blotting-paper, then place in a conc. alcoholic solut. methylene blue for 15 seconds, then rinse in water.

Neisser (SPORE STAIN). Stain in heated carbol-fuchsine, rapidly rinse in 1-% aq. solut. H_2SO_4, double-stain in aqueous or Loeffler's solut. methylene blue; or, stain in aniline-water methylene-violet solut., wash in 1-% aqueous solut. H_2SO_4, and after-stain in acid brown.

Neisser (STAINING METHOD FOR SPORE-BEARING BACILLI). Cover-glass preparations are immersed for 20 minutes in fuchsine-aniline water (conc. alcoholic solut. of fuchsine, 11 Cc.; absolute alcohol, 10 Cc.; aniline water, 100 Cc.); then heat to 80° or 90° C.; next rinse in water, alcohol, or weak acid, according to the nature of the bacilli, counter-stain with aqueous solut. methylene blue, rinse in water, dry and mount in balsam. Spores are stained red and the rest of the bacilli blue.

Neisser-Bienstock (SPORE STAIN). Stain with heated aniline-water fuchsine, wash in HCl-alcohol, and double-stain with methylene blue. Spores are red; bacteria, blue.

Nencki (INDOL). HNO_3 containing nitrous acid gives with indol a red color or ppt. Reaction not afforded with skatol. See also *Baeyer's* test.

Nessler (ALDEHYDE). Aldehydes, when treated with Nessler's ammonia reagent (q. v.) or with a solut. potassium-mercuric

iodide and baryta water, yield a brownish-black ppt., differing from the ppts. given by NH_3 in being insoluble in KCN.

Nessler (AMMONIUM SALTS). Alkaline solut. of mercuric chloride and potassium iodide gives with NH_3 as well as with ammonium salts a yellow to reddish-brown color or ppt. Reagent is prepared according to various formulas, as for instance, as follows: 1.—50 Gm. KI are dissolved in 50 Cc. hot water and conc. mercuric-chloride solut. (20 to 25 Gm. mercuric chloride) added until the ppt. is permanent. After filtering, 150 Gm. KOH dissolved in 30 Cc. water are added, and the whole diluted to one liter. 5 Cc. of the mercuric-chloride solut. are now added, the resulting ppt. allowed to settle, and the clear liquid decanted (*Kubel*). 2.—Dissolve 2 Gm. KI in 5 Gm. water; add 4 Gm. mercuric chloride, or so much that upon warming, a little of the ppt. remains undissolved. After cooling, dilute with 20 Gm. water, filter, and add 30 Cc. solut. of 1 part of KOH in 2 parts water. (*Ludwig*, Medicin. Chemie.)

Nessler (CITRIC ACID IN WINE). Citric acid in wine points to probable adulteration with raspberry juice. The acid is separated as calcium citrate.

Nessler (SULPHURIC ACID IN VINEGAR). Add 2- or 3% cane sugar to vinegar; dip a strip filter-paper in solut. and dry—paper becomes brown to black.

Nessler (TARTARIC ACID IN WINE). A crystalline ppt. forms on evaporating wine to syrupy consistency, extracting with alcohol, and adding solut. sodium- or potassium-acetate.

Nessler (WINE PIGMENTS). Solut. of 7 parts alum and 10 parts sodium acetate in 100 parts water.

Nesteroffsky (GOLD PROCESS). Tissues impregnated with gold are treated with a drop of ammonium-sulphydrate solut. and the reduction finished with glycerin.

Neubauer (ALBUMIN). Solut. albumin is pptd. by neutral and basic lead acetate, copper sulphate, mercuric chloride, and mercuric nitrate. Ppts. are partly soluble in excess of reagent or albumin solut.

Neubauer (AMMONIA IN URINE). On adding milk-of-lime, ammoniacal odors are evolved and detected by litmus paper.

Neubauer (BILIARY ACIDS). Modification of Pettenkofer's test. A few drops urine are evaporated to dryness on the water-bath, a drop of 1:500 sugar solut. and a drop conc. H_2SO_4 added, and the whole heated on a water-bath—if biliary acids present, a violet-red color appears at the edge.

Neubauer (CHLOROFORM IN URINE). Pass a current of air through urine, then through a porcelain tube heated to redness, and finally through a $AgNO_3$ solution. If chloroform present in the urine silver chloride is pptd.

Neubauer (HYDROQUINONE IN URINE). Urine containing hydroquinone (after taking a phenol or benzol), darkens on exposure to air, when made alkaline.

Neubauer (PHENOL). Add phenol to NH_3, then add solut. chlorinated soda, and heat—a blue color develops.

Neubauer (PYROCATECHIN IN URINE). Add 1 drop conc. solut. tartaric acid and then some NH_3 to a dil. solut. Fe_2Cl_6; on dropping in this solut. urine containing pyrocatechin, a violet color develops, turned yellowish-green by acetic acid, and violet again by NH_3.

Neubauer (URIC ACID). On boiling uric acid or potassium urate with ferric chloride, latter is reduced to ferrous salt, and urea and oxalic acid are formed.

Neubauer-Fresenius (PHOSPHORUS). See *Fresenius-Neubauer.*

Neuberg (SUCCINIC ACID). Add NH_3 to the solut. to be examined (if a succinate is present add also ammonium phosphate), evaporate to about 1 Cc., add 1 Gm. zinc dust, and heat. When the excess of NH_3 is evaporated dip a pine-splint moistened with HCl into the test-tube—the wood is colored red if succinic acid present. Reaction is positive so long as no other substances capable of giving the pyrrol reaction present. 0.0006 Gm. succinic acid thus detected.

Neukomm (BILIARY PIGMENTS). Extract with alcohol, evaporate to small bulk, place 1 drop on porcelain plate, add 1 drop dil. H_2SO_4 and a trace sugar solut., and heat gently—a violet color develops.

Neumann-Wender (ALKALOIDS). Solut. 5 drops furfurol in 10 Cc. of pure conc. H_2SO_4. See also *Weppen's* veratrine reaction.

Neumann-Wender (GLUCOSE IN URINE). 1 Cc. dil. urine (1:10) is treated with 1 Cc. each of 1:1000 methylene-blue solut. and normal KOH solut. and boiled for a minute. Complete decolorization indicates that sugar was present in the urine. See also *Mulder's* test.

Nias (CLEANING SLIDES AND COVERS). Boil with solution of washing soda, and rinse.

Nicholle-Morax (STAINING FLAGELLA). Dry films on coverglasses without fixing in the flame, cover with mordant, heat for about 10 seconds, and when steam rises shake off mordant and rinse with water. Repeat process 3 or 4 times, stain with Ziehl-Neelsen's solution, then hold over a flame once or twice for about 15 seconds, and wash.

Nicholson (NITRIC ACID). Evaporate solut. to dryness, moistening with 1 or 2 drops H_2SO_4, and add a trace brucine—if nitric acid present, a red color develops.

Nickel (COLOR REACTIONS OF CARBON COMPOUNDS). See *Zeitsch. f. Anal. Chem.*, 1889, p. 244; also see *Millon's* reagent.

Nickel (MINERAL ACIDS IN ORGANIC ACIDS). Wood is stained by phloroglucin only in the presence of the former, hence if 0.5% HCl is present in vinegar, and phloroglucin added, a piece of pine wood or wood-pulp paper dipped into the solut. is quickly and distinctly stained on boiling the solution up once.

Nickles (FIXED OILS). Oils are distinguished according as they are or are not emulsified by hydrated lime. For details see *Am. Jour. Pharm.*, XXXVIII, p. 299.

Niessing (FIXING SOLUTIONS). Modifications of *Hermann's* mixture, which see. 1.— 5 volumes of 10-% platinic-chloride solution, 20 of 2-% osmic acid, 5 of glacial acetic acid, and 50 of distilled water. 2.—This is the same, except that the distilled water is replaced by sat aqueous solut. of mercuric chloride.

Niggl (LIGNIN). Treat specimen first with aqueous solut. of indol for a few minutes, then with H_2SO_4 (sp. gr. 1.2)—a red color develops if lignin present.

Nikiforow (CLEARING MIXTURE FOR CELLOIDIN SECTIONS). Equal parts of 95-% alcohol and chloroform.

Nikitin (COPPER IN PRESERVED PEAS). Boil peas for 3 minutes in 10-% H_2SO_4—if peas uncolored, they acquire a dark-brown color; if colored with a copper salt, they retain their light-green color.

Nissen (GENTIAN VIOLET STAINING PROCESS). Same as *Bizzozero's* method, except that the treatment with chromic acid is omitted.

Nissl (FUCHSINE STAIN FOR NERVE CELLS). Fresh material in pieces measuring 1 Cc. are hardened in a chromic solution in 70-% alcohol for 2 days, then transferred to absolute alcohol for 5 days, and afterwards cut. Stain the sections singly in a sat. solut. of fuchsine, warming in a deep watch-glass until vapors begin to be given off. Next plunge section into absolute alcohol for 1 or 2 minutes, then place on a slide, flood with clove oil, and when no more color is given off, drain and mount in balsam.

Nissl (METHYLENE BLUE METHOD). Sections of fresh material hardened in 96-% alcohol, are warmed to 65° or 70° C. in a watch-glass containing a solut. of methylene blue, 3.75 parts, and Venice soap, 1.75 part, in distilled water, 1000 parts. When bubbles are given off place sections in a mixture of 10 parts aniline with 90 parts 96-% alcohol until color is no longer given off. Then dry on a slide with filter-paper, clear with cajeput oil, again dry, and finally treat with a few drops of benzin, and mount in benzin colophonium.

Niviere-Hubert (FLUORINE IN WINE). Make wine slightly alkaline with ammonium carbonate, then precipitate any fluorides present, as calcium fluoride, with calcium chloride. After heating incinerated residues with silicic acid and H_2SO_4, fluorine is identified in the usual manner as silicium fluoride.

Nobel (COPAIBA OR GURJUN OIL IN URINE). On adding HCl to urine containing copaiba or Gurjun oil, a red color develops.

Noel (BILIARY PIGMENTS). Apply a drop of HNO_3, to filter-paper dipped in the liquid and dried—a violet color, changing to red and yellow, develops.

Noll (CORROSION METHOD). Treat pieces of sponge with Javelle water until all soft parts are dissolved, then cautiously treat with acetic acid to remove all pptd. matter; after pass-

ing through successive alcohols and through clove oil, mount in balsam.

Noll (SALICYLIC VINEGAR AND GUM MEDIUM). Mix equal volumes Meyer's salicylic vinegar (2) and Farrant's medium. This mixture never becomes turbid and does not dry up. It serves well for delicate Crustacea and their larva; also for hardened and stained preparations of Hydroids, small Medusæ and other Cœlenterates.

Noll (SOLUTION). Solut. sodium hypochlorite.

Nowak-Kratschmer (ALKALOIDS). Color reactions are afforded with syrupy phosphoric acid.

Nylander (GLUCOSE). Dissolve 2 Gm. bismuth subnitrate and 4 Gm. Rochelle salt in 100 Gm. of 8-% NaOH solut. To 10 parts of solut. to be tested (diabetic urine), add 1 part reagent and boil—a darkening due to reduction of bismuth salt, indicates glucose. Also known as *Almén's* solution.

Nylander-Almén. See *Almén-Nylander.*

Oberdoerffer (ALCOHOL IN ESSENTIAL OILS). Expose oil under a bell-jar, together with a watch-glass containing platinum black, over which is a strip of moistened blue litmus paper. The paper is reddened by the acetic acid formed if alcohol present.

Obermayer (INDICAN IN URINE). 1.—Add to urine conc. HCl containing ferric chloride, and shake out with chloroform, if indican present, chloroform turns blue from solution of indigo formed. Excess of reagent does not affect reaction. See *Hammarsten's* test. 2.—Treat urine with lead acetate and clear filtrate from the ppt. Shake with a 0.5-% solut. ferric chloride in fuming hydrochloric acid (sp. gr. 1.19). Upon extracting with chloroform, the latter is colored blue if indican was present.

Obermeier. See *Obermayer.*

Obermueller (CHOLESTERIN). If cholesterin is carefully melted over a naked flame with a few drops propionic anhydride, the melted mass on cooling turns violet, then blue, green, orange, carmine, and finally copper-red.

Oglialoro (PICROTOXIN). 1.—Dissolve fragment in 2 Gm. HNO_3 (sp. gr. 1.4) and warm—a yellowish-red mass remains, turned bright red by 2 Gm. KOH solut., and on warming, to

color of old blood. 2.—Mix a little picrotoxin with 4 to 5 Gm. conc. H_2SO_4—latter is colored golden-yellow, then saffron yellow. On adding potassium bichromate a greenish-violet develops; on diluting with water, solut. is greenish-yellow.

Ogston (CHLORAL HYDRATE). Addition of ammonium sulphydrate to a solut. containing chloral hydrate causes a brown color, and on heating a red ppt. forms.

Ohlmacher (FORMALDEHYDE STAINING). Formaldehyde 2- to 4-% is used as a mordant for tar colors. Tissues may be mordanted separately by treatment for 1 minute or longer, or the formaldehyde may be added to the stain. Dissolve 1 Gm. fuchsine in 10 Cc. absolute alcohol, and add to 100 Cc. 4-% formaldehyde. Or, add sat. alcoholic solut. of gentian violet or methyl violet 5 B. to the formaldehyde in the proportion of 1:10. In the case of methylene blue, dissolve 1 Gm. in 100 Cc. formaldehyde solut. Sections stain in half a minute, and are said to resist alcohol much more than if formaldehyde were not used.

Oliver (ALBUMIN AND SUGAR). Filter paper saturated with well known reagents for albumin and sugar in urine. For *albumin:* Picric and citric acids; sodium tungstate and citric acid; potassium-mercuric iodide and citric acid; potassium ferrocyanide and citric acid, separately. For *sugar:* Indigo carmine and sodium carbonate, separately. See *Geissler's* test.

Oliver (BILIARY ACIDS). Dilute urine to sp. gr. 1,008, and mix 20 minims with 60 minims of a solut. of meat-peptone 30 grn., salicylic acid 4 grn., acetic acid 30 minims, and water 8 fl. oz. If biliary acid present, a ppt. forms.

Oliver (GALLIC AND TANNIC ACIDS). Add 10 drops strong HNO_3 to salmon-red solut. obtained by adding 1 grain gallic acid to 90 minims NH_3, and set aside for some time—no ppt. forms, but color changes to deep red. Tannic acid similarly treated, yields a colored solut. with a flocculent ppt. insoluble in excess of acid, in a few moments.

Oppitz (SILVER STAINING). Reduction is very rapidly effected by placing the preparations for 2 or 3 minutes in a 0.25- to 0.5-% solut. of tin chloride.

Opwyrda (TURMERIC IN RHUBARB). An alcoholic solut. of boric acid affords a red color with turmeric, which changes to greenish-black on adding KOH.

Orlow (PHENOLS). Uranium acetate gives a sharp reaction with pyrogallol, hydroquinone, pyrocatechin, gallic acid, salicylic acid, and morphine. Phenol, eugenol, cresol, resorcin, phloroglucin, alpha-naphtol, beta-naphtol, and guaiacol but a slight reaction. No reaction is obtained with thymol.

Orlow-Horst (ALKALOIDS). Ammonium persulphate gives with *cocaine* a colorless ppt. in form of a viscid liquid solut. in excess of reagent. *Strychnine* affords a pulverulent ppt. In admixture with H_2SO_4, ammonium persulphate affords the following reactions: *Chelidonine*, yellow, changing to green and finally brown; *chelerythrine*, violet, changing to black; *sanguinarine*, dark-brown; *corydaline*, yellow, then dirty-green, finally dirty-yellow; *morphine*, pale-orange; *codeine*, orange; *narcotine*, reddish-orange; *papaverine*, yellow; *narceine*, violet changing to blood-red, and finally yellow; *apomorphine*, green, changing to blue.

Orlowski (ANALYTICAL REAGENT). Use ammonium thiosulphate instead of hydrogen sulphide as a group reagent. See *Journ. Chem. Soc.* (Abstracts), 1884, p. 363.

Orth (LITHIUM CARMINE). Digest 2.5 Gm. carmine in 100 Cc. sat. aqueous solut. of lithium carbonate (1 Gm. in 70 Cc. distilled water), and filter.

Orth (METHYL-VIOLET STAIN). Soak sections in water, then place in solut. of 1 part aniline violet in 300 parts acetic acid. Do not wash, but simply drain, and mount in solut. of 1 part potassium acetate in 2 parts water.

Oser-Kalmann (INDICATOR). The product of the action of potassium permanganate and sulphuric acid on gallic acid is fused with caustic potash. The red color of the compound thus obtained is changed to yellow by acids.

O'Shaughnessy (OPIUM). On adding a ferric salt to a solut. containing opium, red iron meconate is formed. The color of this is not affected by alkaline solutions, whereas sulphocyanide of iron is decolorized when similarly treated.

Ost (SUGAR). A solut. containing 23.5 Gm. copper sulphate, 250 Gm. sodium carbonate, and 100 Gm. potassium bicarbon-

ate per liter is used for the determination of sugar. See also *Soldaini's* test.

Oster (ARSENIC IN HYDROCHLORIC ACID). Boil the acid with pure tin-foil—a brown stain is formed on the metal, if arsenic present.

Ott (BILIRUBIN IN URINE). Improved *Salkowsky's* test. Make urine alkaline with sodium carbonate, and add $CaCl_2$ until no ppt. further forms. Filter off gelatinous ppt., wash well, and dissolve in alcohol by aid of HCl. On boiling, solut. acquires a green to blue if biliary pigment present; otherwise no color forms. On adding HNO_3, green solut. becomes blue, red, and finally violet. If much albumin or hemoglobin present, or after taking certain remedies, *c. g.* salol, test for bilirubin is inconclusive.

Otto (ALCOHOL). Add to liquid an equal volume conc. H_2SO_4 and a little sodium acetate—if alcohol present, odor of acetic ether will be observed.

Otto (ALKALOIDS). Solut. sodium tungstate containing some phosphoric acid, gives ppts.

Otto (DIGITALIN). 1.—Dissolve digitalin in conc. H_2SO_4 and add some bromine water—a light-purple color develops. 2.—Warm aqueous solut. with few drops solut. phosphomolybdic acid—a fine green color develops, changed to blue by NH_3.

Otto (MORPHINE). With HCl, Fe_2Cl_6, and potassium ferricyanide, morphine yields a ppt. of Prussian blue.

Otto (PICROTOXIN). A solut. of the alkaloid in conc. H_2SO_4 is colored reddish-brown at the zone of contact by a drop of potassium-bichromate solut.; upon mixing, the solut. is colored green.

Otto (STRYCHNINE). Mix substance (*e. g.* evaporation residue of ethereal or alcoholic extract) with a few drops dil. solut. potassium bichromate. Dip a glass rod into this solut., and then draw it through conc. H_2SO —if strychnine present, blue streaks will appear.

Otto (SUGAR). Modified *Fehling's* test. Solut. of 1 part copper sulphate and 3 parts tartaric acid, to which enough NaOH is added to just effect a clear solution.

Otto-Stas (ALKALOIDS). Extract with alcohol containing tartaric or oxalic acid, then use alcohol and ether. See *Am. Journ. Pharm.*, 1874, p. 120.

Oudemans (QUINAMINE). When a drop of liquid containing quinamine is overlaid on H_2SO_4 containing a trace of HNO_3, a chestnut-brown to orange-red color is produced, which changes to purple on adding water.

Overbeck (COTTON IN WOOLLEN). Soak fabric in an aqueous solut. of alloxantin (1 in 10), and after drying expose to NH_3 vapor and rinse in water. Woollen material is colored crimson, cotton remains white.

Overbeck (IODINE). A blue color develops on passing a current of hyponitrous acid gas into the liquid, if the latter has previously been mixed with starch paste.

Overton (BLEACHING OSMIC OBJECTS). Bleaching is completed in a few minutes in a mixture of 1 part commercial hydrogen dioxide with 10 to 25 parts 70-% alcohol.

Overton (IODINE FIXING). Heat iodine in a test-tube till vapor is given off, then incline tube so that the vapor may flow over objects arranged on a slide. Afterwards warm slide to about 40° C. for 2 or 3 minutes, in order to drive off the iodine, prior to mounting or further treatment.

Pacini (PRESERVATIVE SOLUTIONS). These are employed to preserve microscopic sections. 1.—1 part mercuric chloride, 2 parts sodium chloride, 13 parts glycerin (25° Bé.), and 113 parts of water; 2.—1 part mercuric chloride, 2 parts acetic acid, 43 parts glycerin (25° Bé.), and 275 parts water.

Pacquelin-Joly (PYROPHOSPHORIC ACID IN URINE). See *Joly-Pacquelin.*

Pagel (PHOSPHORUS IN PHOSPHORIC ACID). A white opalescence or ppt. forms upon warming acid with an equal volume mercuric-chloride solut. (1:60) to about 180° C.

Pagenstecher (HYDROCYANIC ACID). Filter-paper is soaked in freshly-prepared tincture guaiac (3- to 4-%), dried and moistened with copper-sulphate solut. (0.25-%). HCN colors the prepared paper blue. See also *Schoenbein-Pagenstecher.*

Pain (SANTONIN). On heating a fragment of santonin with an alcoholic solut. of ethyl nitrate, and then adding a few drops

KOH solut. to the hot liquid, a reddish-violet color develops. The reaction will readily detect 0.001 Gm. santonin.

Pal (BLEACHING SOLUTION). Dissolve 1 Gm. each of oxalic acid and potassium sulphite in 200 Cc. distilled water.

Pal (HEMATOXYLIN METHOD) Proceed at first as in Weigert's process for nerve fiber, omitting the copper bath, and stain in Pal's hematoxylin solution (see below) for 5 or 6 hours. Then wash sections in distilled water (containing a trace of lithium carbonate if the sections are not deep blue), next treat for 15 to 30 seconds with a 0.25-% potassium permanganate solut., rinse in water, and decolorize in Pal's bleaching solution. (If black spots appear replace in the permanganate solut., again bleach, and wash dry for 15 minutes in water.) The gray substance of the sections is decolorized in a few seconds; the sections should then be well washed out, and may be double-stained with picro-carmine or acetic-acid carmine (see *Schneider*), Magdala red, or eosine. The nuclei may be stained with alum carmine. Finally dehydrate, clear, and mount.

Pal (HEMATOXYLIN STAIN). Dissolve 0.75 Gm. hematoxylin in 90 Cc. distilled water and 10 Cc. absolute alcohol. Just before use add sat. solut. lithium carbonate in the proportion of 3 drops to each 10 Cc. of hematoxylin solution. See also *Weigert.*

Pal-Exner (OSMIC-ACID-METHOD). Spinal cord or brain in ¼-inch cubes is immersed in 0.5-% osmic-acid solut. for 2 days, the solution being changed each day; then wash in water, transfer to absolute alcohol, and imbed in celloidin or paraffin. Place sections as cut in glycerin, then wash in water, treat with potassium permanganate and Pal's solution, as in Pal's hematoxylin method, counter-stain with carmine, dehydrate, clear, and mount in balsam.

Paladino (PALLADIUM-IODIDE STAIN). Pieces of nerve fiber hardened in bichromate, chromic acid, or corrosive sublimate, and not more than 5 to 8 Mm. thick, are immersed for 2 days in a large quantity of 0.1-% palladium-chloride solut. (prepared by dissolving 10 Gm. of the salt in 1 liter of water, with the aid of 4 to 6 drops HCl, and diluting as required). Next treat for 24 hours with a 1-% KI solut., dehydrate, imbed if

necessary in paraffin by the chloroform method, and mount in balsam.

Palm (ALKALOIDS). 1.—Sodium sulphantimonate gives milky to yellow or red-brown ppts. 2.—Lead chloride dissolved in sodium-chloride solut. gives colorless crystalline ppts. See *Chem. News*, 1883, p. 65.

Palm (NICOTINE). On heating gently with a little HCl, a violet color is developed which changes to orange-red on adding NHO_3.

Palm (PICROTOXIN). An insoluble salt is formed by treatment with an ammoniacal solut. of basic lead acetate.

Paneth (WEIGERT'S STAIN). In this modification 1 part of commercial extract of logwood is dissolved in 90 parts water and 10 parts alcohol. Then filter and add 8 drops of conc. solut. of lithium carbonate for each 100 Cc. Sections require from 18 to 24 hours in this stain at the normal temperature.

Panum (ALBUMIN). A coagulum forms on boiling a liquid containing albumin (urine) with an equal volume of a sat. solut. of sodium sulphate or chloride.

Pape (DIGITALIN). Mixture of 1 part amorphous digitalin with 10 parts starch gives with conc. H_2SO_4 a paste in which the starch granules are blackish-brown, but on adding HNO_3, deep green; if cane sugar present, the green color rapidly disappears. Crystallized digitalin treated as above yields similar reactions, but the green color is more subdued. If cane sugar is added to the digitalin mixture, H_2SO_4 causes a yellow, then orange, and finally deep-brown. The digitalin-starch mixture, treated with H_2SO_4, then HCl, and finally water, yields a green mass.

Papasogli (CANE SUGAR). Add a few drops 5-% solut. cobalt nitrate and an excess of 50-% solut. NaOH to a solut. containing saccharose—a permanent violet color develops. Glucose affords a blue color changing soon to dirty-green. Test may be applied in solutions containing glucose, caramel, or alcohol, or even in mixtures containing 10 times as much glucose as saccharose. Wines should first be decolorized by animal charcoal or basic lead acetate. Lactose treated as above gives an evanescent blue color. Honey gives a similar reaction, the blue becoming dirty-green. Solutions contain-

ing acacia or dextrin should first be freed from these by lead acetate or barium hydrate. See *Reich's* test.

Papasogli (COBALT). A blood-red color develops on adding a solut. of potassium cyanide till the ppt. formed is re-dissolved, then adding a few drops of yellow ammonium sulphydrate.

Papasogli (NICKEL). On dissolving nickel in a solut. of potassium cyanide and immersing a strip of zinc, the solut. turns red, and the zinc is covered with a black deposit.

Papasogli-Poli (CITRIC, SUCCINIC, AND MALIC ACIDS). On pptng. with calcium chloride, decomposing with dilute H_2SO_4, and boiling with potassium bichromate, a yellow color indicates succinic acid; green, without odor, citric acid; green, with fruity odor, malic acid.

Papasogli-Poli (MALIC ACID). An odor of over-ripe fruit is given off when malic acid is heated with potassium bichromate and sulphuric acid.

Parietti (EXTRANEOUS ORGANISMS AMONG TYPHOID-FEVER BACILLI). To prevent typhoid-fever bacilli being crowded out by extraneous organisms, add to the tubes of broth to be employed about 5 drops of a mixture of sterilized water, 100 parts; HCl, 4 parts; and carbolic acid, 5 parts.

Parker (METHYLENE BLUE). This stain is fixed in sections or pieces of tissue, in the form of a finely grained purplish ppt., by cold, conc. aqueous mercuric-chloride solut. Next dehydrate the preparations in a solut. of 1 Gm. mercuric chloride in 5 Cc. of methylal, then treat with a mixture of 2 parts xylene, 1 part of methylal, and 1 part of the dehydrating mixture. Subsequently leave in pure xylene for 4 or 5 days to remove all trace of mercuric chloride, and finally mount sections in balsam, or imbed tissue in paraffin prior to cutting sections. Fix sections to slide with *Schaellibaum's* collodion.

Parker (TURPENTINE CEMENT). Dissolve true Venice turpentine in sufficient alcohol to enable it to pass through a filter, and after filtering the mixture, evaporate to about three-fourths its original bulk, or until a little becomes hard and breaks with a vitreous fracture when dropped into cold water. This cement is useful for closing glycerin mounts with square covers. After clearing off superfluous glycerin apply the cement with a piece of copper wire bent at right angles. This

can readily be heated in a spirit-lamp flame, and after plunging into the cement is brought down flat on the slide, near the edge of the cover. The cement distributes itself and hardens immediately, so that the slide can be cleaned as soon as the four sides are finished. See *Csokor*.

Parker-Floyd (FORMALDEHYDE FOR HARDENING). A mixture of 2 volumes formaldehyde with 98 volumes water is said to harden a sheep's brain in 7 to 10 days. To obviate the tendency to increase the volume of the mass, mix 6 volumes of 95-% alcohol with 4 volumes of above mixture. Brains may be kept for months in the mixture.

Partheil (MARGARINE). A solut. of dimethylamdioazobenzene in oil is added to the substance: on contact with a mineral acid, the mixture develops a red color if margarine present. (Reagent is not to be mistaken for Butter Yellow, the sodium salt of dimethylamidoazobenzenesulphonate.)

Partsch (COCHINEAL ALUM-CARMINE). Boil cochineal for some time with a 5-% alum solution filter, and add a little salicylic acid to preserve from mold.

Pasteur (CINCHONA ALKALOIDS). These bases are distinguished by their action on polarized light. See *Pharm. Journ.*, 1857-58, p. 463.

Pasteur (CULTURE MEDIUM). 1.—Rock candy, 10 Gm.; yeast ash, 0.075 Gm.; water, 100 Gm. 2.—Rock candy, 10 Gm.; ammonium carbonate, 1Gm.; yeast ash, 1 Gm.; water, 100 Gm.

Pasteur (GLUCOSE). Dissolve separately, 130 Gm. NaOH, 105 Gm. tartaric acid, 80 Gm. KOH, and 40 Gm. cryst. $CuSO_4$, then mix, and make up to 1 liter with water.

Pasteur-Wurtz (FUCHSINE IN WINE). Add baryta water till the wine is faintly alkaline, then filter, acidify with acetic acid, and shake out the fuchsine with fusel oil.

Paton (GLOBULIN IN URINE). Make urine alkaline, and overlay on sat. solut. magnesium sulphate—if globulin present a white zone forms.

Patrouillard (ARSENIC IN ALKALINE SALTS). Boil the suspected salt with 4 per cent. of oxalic acid, and identify the arsenous acid by some recognized test.

Paul (BILIARY PIGMENTS). Normal urine (or urine containing sugar or albumin) colored with methyl violet, remains un-

changed; if, however, biliary pigments are present, the violet color changes to a blood-red.

Paul (CINCHONIDINE IN QUININE SULPHATE). Dissolve 5 Gm. of sample in 150 Cc. boiling water, cool, and filter; press out as dry as possible, redissolve crystals, and again crystallize. Filter, mix the filtrates, and add just enough ether to give a visible layer after shaking, then add a slight excess NH_3, and let stand over night in a well-corked flask. Collect crystalline cinchonidine on a tared filter, dry and weigh.

Paul-Cownley (CEPHÆLINE). Dissolve the ipecac alkaloids in dilute HCl; add NaOH, and shake with ether. Separate ethereal layer containing the emetine alkaloid, then acidify the soda solution and shake with ether and NH_3. The cephæline crystallizes out from the ether in a few hours in a mass of white light crystals.

Paul-Cownley (CEPHÆLINE AND EMETINE). To determine these bases mix 50 Gm. powdered root with 10 Gm. lime, moisten with water, and extract by percolation with amylic alcohol. The alkaloids are extracted from this percolate by shaking out with dil. H_2SO_4. Mix acid solut. with excess of NH_3 and shake with ether. The separated ethereal solution is evaporated, and the residue titrated, with semi-normal HCl, the number of Cc. required being noted. The solut. of hydrochlorates is then mixed with excess of NaOH, washed out with ether, the separated ether again treated with acid and with NaOH, and the process repeated until no ppt. forms on adding NH_4Cl to the alkaline liquor. The ether solut. of emetine is then evaporated and the residue titrated with semi-normal acid, the alkaloid being expressed as emetine. From the alkaline liquors cephæline is pptd. by adding NH_4Cl and shaking out with ether, the residue of the ethereal solut. being titrated as before. The sum of the two titrations should approximate to that of the two alkaloids determined together.

Paul-Cownley (CUPREINE IN CINCHONA ALKALOIDS). Dissolve mixed alkaloids in weak acids, and agitate with ether and NaOH; separate the ether, then acidify the soda liquor, and shake with ether and NH_3. Cupreine if present will separate in the form of heavy crystals in about 12 to 24 hours.

Pavy (ALBUMIN). Citric acid and potassium (or sodium) ferrocyanide, each in tablet form. Acidulate urine with the former, and add the latter—the usual whitish-yellow ppt. indicates presence of urine. See also *Oliver's* papers.

Pavy (GLUCOSE). Dissolve 4.158 Gm. cryst. copper sulphate, 20.4 Gm. potassium-sodium tartrate, and 20.4 Gm. KOH in water, add 300 Cc. NH_3 (sp. gr. 0.88), and dilute with water to 1 liter. Each 10 Cc. of this solut. represents 0.005 Gm. glucose. The solut. becomes colorless when all the cupric salt has been reduced to the cuprous condition. See *Fehling's* solution. *Pavy's* cupric test pellets consist of copper sulphate, potassium-sodium tartrate, and KOH in the proper proportions.

Payer (HYDROCYANIC ACID). Reagent is a very dilute alcoholic solut. of guaiac resin, containing a trace of copper sulphate. Upon bringing this mixture, in a porcelain capsule, into contact with a glass rod moistened with hydrocyanic acid, blue streaks are formed in the liquid; upon stirring, the whole solution turns blue. See also *Schoenbein-Pagenstecher's* test.

Pechmann-Ihl (LEVULOSE). See *Ihl-Pechmann.*

Pegna (NITROBENZENE IN ALMOND OIL). Mix the oil with alcohol, add some KOH and a few drops of Fe_2Cl_6 solut., then distil after standing for a few hours. If nitrobenzene present, a dark color will develop on pouring distillate on KOH and heating; on adding chlorinated-lime solut. the color changes to violet.

Peligot (GLUCOSE). Test depends upon solubility of lime in the presence of glucose. The latter is destroyed on boiling, and on making two assays of lime, one with the cold solut. of glucose, the other with the same solution after boiling, the difference between the two assays will represent glucose.

Pellagri (BRUCINE). On dissolving brucine in conc. HCl and heating with the addition of H_2SO_4, a blue color develops on neutralizing solut. with $NaHCO_3$.

Pellagri (INDICATOR). Prepare a solution of phyllocyanin and add sufficient of any acid to turn it purple. Alkalies change the color to green, then yellow, and finally almost black.

Pellagri (MORPHINE). Dissolve the base, or the residue left on evaporating a solut. containing it, in conc. HCl, add a few

drops of strong H_2SO_4, and heat on a water-bath—a distinct purple color should be apparent. Next add more HCl, neutralize solut. with $NaHCO_3$, and add an alcoholic solut. of iodine—the liquid acquires a deep chrome-green color.

Pellet (GLUCOSE). 68.7 Gm. $CuSO_4$, 200 Gm. of NaCl, 100 Gm. of anhydrous Na_2CO_3, and 6.87 Gm. of NH_4Cl are dissolved in hot water and diluted with water to 1 liter. 10 Cc. of this solut. are reduced by 0.05 Gm. glucose. See *Fehling's* solution.

Pelletier (QUININE). Chlorine gas passed into water containing quinine in suspension dissolves it, and the color of the solution changes from light-red to violet, then to dark-red.

Peloggio (IODINE). A blue color develops on passing a galvanic current through a liquid containing iodine in combination in the presence of starch paste and a little HCl.

Pelouze (GLUCOSE). See *Moore's* test.

Peltier (SILK AND WOOL FIBER). Silk is dissolved by a mixture of equal parts conc. HNO_3 and H_2SO_4, while wool is colored yellow.

Penot (OILS). Chromic acid gives distinctive color reactions with oils.

Penzoldt (ACETONE). Dissolve a few crystals of ortho-nitrobenzaldehyde in water, add to distillate from urine, then render alkaline with NaOH—if acetone present, the mixture becomes yellow, then green, and after several minutes indigo precipitates.

Penzoldt (BILIARY PIGMENTS). Filter a large quantity urine through a double filter; dry the latter and pour on it a few Cc. acetic acid—a green color develops, particularly on warming.

Penzoldt (NAPHTALIN). Let 1 Cc. conc. H_2SO_4 trickle into a urine containing a trace of naphtalin—the supernatant urine will be colored dark-green immediately. The acid also acquires the same color after a time.

Penzoldt (SUGAR). Render urine strongly alkaline and treat with a 1:60 solut. of diazobenzenesulphonic acid. (*Ehrlich's* reagent.) At the same time a control test is made using normal urine. The latter is colored yellowish-red by the reagent, whereas diabetic urine soon becomes dark-red and opaque.

Penzoldt (THALLIN). Shake liquid with chloroform, and add a drop ferric-ch oride solut. to chloroformic extract—a dark-green color develop if thallin present.

Penzoldt-Fischer (ALDEHYDES). A red color, changing to violet, is produced by aldehydes on adding an alkaline aqueous solut. of diazobenzenesulphonic acid (1:60) in the presence of sodium amalgam.

Penzoldt-Fischer (PHENOL). Diazobenzenesulphonic acid (*Ehrlich's* reagent) gives a deep-red color with an alkaline phenol solut.

Perenyi (FIXING FLUIDS). 1.—4 parts 10-% NHO_3, 3 parts alcohol, and 3 parts 0.5-%, chromic acid solut. Immerse objects for 4 to 5 hours, then pass through 70-% alcohol (24 hours), strong alcohol (some days), absolute alcohol, (4 to 5 days), then cut sections. 2.—3 parts of 20-% NHO_3, 3 parts of 1-% chromic acid, and 4 parts absolute alcohol. This is a special mixture, used for embryos of Lacerta. Fix for 20 minutes, wash out for an hour with 70-% alcohol, and then with strong alcohol, Stain with Delafield's hematoxylin, and treat for 3 to 5 minutes with 1-% chromic acid.

Perenyi (HARDENING SOLUTION). Mix 4 volumes of 10-% HNO_3, 3 volumes alcohol, and 3 volumes of 0.5-% solut. chromic acid.

Perrins (BERBERINE). Brilliant green spangles form on adding a dilute solut. of iodine with KI to an alcoholic solut. of berberine.

Perrot (ESSENTIAL OILS). A solut. of dimethyl-aniline violet in glacial acetic acid and dilute alcohol gives characteristic colors with many ethers, aldehydes, phenols, etc., but does not react with fatty oils or hydrocarbons. It may, therefore, be employed to detect many adulterations in essential oils.

Persoz (DIFFERENTIATING TEXTILE FIBERS). Dissolve 10 Gm. zinc chloride with 2 Gm. zinc oxide in 10 Gm. water. Upon digesting any fabric in this basic zinc-chloride solut. at 30° to 40° C. any silk contained is dissolved.

Pesci (ALKALOIDS). Solut. of copper sulphate and sodium thiosulphate acidulated with H_3SO_4.

Petermann (CORN-COCKLE SEEDS IN FLOUR). Test based on isolation of the saponin in corn-cockle seeds. Heat 500 Gm.

flour with 1 liter 85-% alcohol, filter while hot, concentrate filtrate, and ppt. saponin by adding absolute alcohol and a little ether. Collect saponin after 12 to 24 hours, dry at 100° C., dissolve in a little water, and again ppt. with alcoholic ether. Saponin characterized by acid taste, frothing of aqueous solut., and reduction of *Fehling's* solut. (especially after hydrolyzing with HCl).

Petri (PROTEIDS). Proteids or peptone solut. give with diazobenzenesulphonic acid a light-yellow color changed by alkali to orange-yellow and brown, and on shaking give a red froth.

Petri (KAIRIN IN URINE). Add acetic acid and solut. calcium chloride—if kairin present, a fuchsine-red color develops.

Pettenkofer (BILIARY ACIDS). On adding to a small quantity of a solut. of biliary acid (*e. g.*, urine) two-thirds its bulk of conc. H_2SO_4, drop by drop (so as not to heat above 62° C.), and 2 to 5 drops of a 1 : 5 solut. of cane sugar, an intense violet or purple-red color develops. *Strassburg* modifies test by dissolving cane sugar in the urine, saturating filter-paper with the solut. and, after drying, bringing the paper in contact with a drop of H_2SO_4. The color is then seen on holding the paper to the light. *Drechsel* uses phosphoric acid instead of sulphuric, and *Udransky* replaces the cane sugar and H_2SO_4 by furfurol-sulphuric acid. See also *Neubauer's* test. By reversing the process, Pettenkofer's reaction can also be employed in testing for sugar and for presence of glucosides. See *Brunner's* test for digitalin.

Pettenkofer (CARBONIC ACID). Dissolve 1 part of rosolic acid or corallin in 500 parts 80-% alcohol and add baryta water until a reddish color is obtained. On adding 0.5 Cc. of this solution to 50 Cc. water containing bicarbonates, the red color will disappear if free CO_2 present.

Pettenkofer (SUGAR). By reversing Pettenkofer's process for detecting biliary acids, as in *Brunner's* test, the reaction serves as a test for sugar from glucosides. H_2SO_4 is added to an aqueous solution of the bile till the precipitate first formed is redissolved, and on adding the liquid containing sugar, a violet color develops.

Petti (PHYSOSTIGMINE). On adding dil. HCl to saturation, followed by excess of NH_3, and then heating, the color-changes

in the case of physostigmine will be as follows: Pale-red, red, yellowish-red, green, and blue.

Pewsner-Nastinkow (STAINING TUBERCLE BACILLI). Shake a 1:2,000 solut. $HgCl_2$ with a few drops aniline, and filter. To 10 Cc. filtrate add 1 Cc. 10-% solut. gentian-violet, methyl-violet, or fuchsine, in absolute alcohol. Immerse specimen in this solut. for 5 minutes, rinse in water, decolorize with dil. HCl, and again wash with water. Preparation may now be tinged with complementary colors (solut. malachite green or eosine, 0.06 Gm. in 60 Cc. 1:2,000 solut. $HgCl_2$). Preparation should not remain longer than 1 or 2 seconds in latter solut.

To detect tubercle bacilli in the tissue, dehydrate latter by 2 days' immersion in absolute alcohol, then imbed in mixture of 5 parts paraffin and 1 part chloroform for 20 to 60 minutes, then in pure melted paraffin for 10 to 20 minutes (on water-bath). When cold, make sections, from which dissolve out paraffin with xylene, wash with alcohol, and immerse in water. Then dry sections on glass, treat with chloroform, and stain as above.

Pfeiffer (SERUM REACTION FOR CHOLERA). Trace of blood serum of a cholera-immune guinea-pig destroys vitality of true cholera bacilli contained in serum of normal guinea-pig and a little bouillon. Vibrios similar to those of cholera are not killed by the serum; other tests, such as that for typhoid bacilli may be carried out in similar manner. *Gruber* states that the reaction may be conducted in a test-tube. See *Widal's* test.

Pfitzner (DAMMAR SOLUTION). Dissolve dammar in a mixture of benzene and turpentine.

Pfitzner (SAFRANINE STAIN). Dissolve 1 part safranine in 100 parts absolute alcohol, and after a few days add 200 parts water.

Pfuhl-Petri (TUBERCLE STAIN). Stain in warmed solut. of 10 Cc. sat. alcoholic solut. fuchsine and 100 Cc. water, for 1 or 2 minutes. Decolorize in acetic acid for 1 or 2 minutes, rinse in water, and double-stain in alcoholic aqueous solut. malachite green for ½ to 1 minute; then rinse in water, dry, and mount in balsam.

Phipson (BENZOIC, HIPPURIC, AND SALICYLIC ACIDS). On mixing 3 equivalents of acid with 1 equivalent of glucose and a large excess of H_2SO_4, a moderate heat causes development of a brown color changing to black. See *Chemical News*, xxviii, 13.

Phipson (FRANGULIN). H_2SO_4 causes an emerald-green color changing to purple and then dark-red.

Pianese (METHYLENE-BLUE-EOSINE STAIN). The same as *Chenzinsky's* solut., with addition of a considerable proportion of lithium carbonate.

Picard (AMMONIACUM). Modified *Plugge's* reagent for ammoniacum, with substitution of sodium hypobromite for sodium hypochlorite.

Piccini (NITRIC IN PRESENCE OF NITROUS ACID). Add urea to the liquid containing nitrates and nitrites, which then mix with a solut. of urea in dil. H_2SO_4. When evolution of nitrogen from decomposed nitrites ceases, a blue color develops on adding KI, starch paste, and a fragment of zinc.

Pichard (NITRITES). Add a particle brucine and 1 drop HCl to solut.—in about 5 minutes a vermilion-red to light-yellow color develops if a nitrite present; 1 part nitrous nitrogen in 640,000 water thus detected. Nitrates treated as above give no reaction. Said to be more sensitive than *Griess*, *Tromsdorff* and *Piccini* tests.

Pick (PRESERVATIVE SOLUTION FOR ANATOMICAL SPECIMENS). 50 Gm. formaldehyde, 50 Gm. artificial Carlsbad salts, 1,000 Cc. water.

Pick (STAIN FOR GONOCOCCI). Ziehl's carbol-fuchsine, 15 drops; conc. alcoholic solut. methyl blue, 8 drops; dist. water, 20 Cc. Stain cold for 10 seconds, wash, dry, and mount. Gonococci are stained deep-blue; other bacteria light-blue, cell nuclei very light-blue, and protoplasm pink.

Pictet (EXAMINATION LIQUID). A 5- to 10-% solut. of manganese chloride is used in place of normal salt solution for marine animals. For terrestrial animals use a 1- to 3-% solut. only.

Piffard (SUGAR IN URINE). A paste is prepared by mixing in the mortar copper sulphate, 1; sodium-potassium tartrate, 5; NaOH, 2. See *Fehling's* solution.

Pilhastry (FORMALDEHYDE). Dissolve 1 Gm. phenylhydrazine hydrochlorate and 1.5 Gm. sodium acetate in 100 Gm. water. On heating 3 Cc. of the suspected solut. for 1 minute with 5 drops H_2SO_4 and 5 drops of the reagent, a characteristic green color develops (visible in solut. of formaldehyde 1 : 250,000).

Pinerna (ORGANIC ACIDS). A solut. of beta-naphtol, 0.02 Gm. in conc. H_2SO_4, 1.83, 1 Cc. If 0.05 Gm. of organic acid is carefully heated with 10 to 15 drops of reagent, distinctive color reactions are obtained; *tartaric acid* gives a blue then green color, on dilution, a reddish-yellow tint; *citric acid* reacts with a blue color, on dilution colorless, to light-yellow; *malic acid* greenish-yellow, then light-yellow, and orange on dilution.

Piotrowski (PROTEIDS). This is the biuret reaction. See also *Rose's*, *Brucke's*, *Posner's*, and *Ritthausen's* tests.

Pirette (BUTTER). Modified *Reichert-Meissl* method. Add 10 Cc. H_2SO_4 to 5 Gm. butter stirring constantly. When mixture clear and transparent, dilute with 150 Cc. water, and add conc. solut. potassium permanganate until red color retained for several seconds. Odor of SO_3 will then have disappeared, and the acid completely oxidized. Then distil off 110 Cc. and treat as usual.

Piria (TYROSIN). Heat sediment from suspected urine with a little conc. H_2SO_4 for 5 to 10 minutes, dilute with water, warm, neutralize with calcium or barium carbonate, and treat the filtrate with ferric-chloride solut. The solut. is colored violet if tyrosin present. An excess of ferric chloride destroys the color.

Piria-Staedeler (TYROSIN). In this modification of *Piria's* test, the urinary sediment is warmed with the acid, then neutralized with barium carbonate, boiled, filtered, and added drop by drop to a dil. solut. Fe_2Cl_6.

Piso Borme - Moleschott (SOLUTION). See *Moleschott - Piso Borme*.

Planta (ALKALOIDS). Potassio-mercuric iodide gives white ppts. See *Mayer's* test.

Plaut (ACTINOMYCOSIS). Place sections of tissue affected with actinomycosis for 10 minutes in *Gibbes'* magenta solut., or *Ziehl-Neelsen* carbolic-fuchsine solut. at 45° C.; next rinse

in water, and place in sat. aqueous solut. of picric acid, mixed with an equal volume absolute alcohol, for 5 to 10 minutes, wash with water, pass through 50-% alcohol into absolute alcohol, clear in cedar oil, and mount in balsam. In *Squire's* modification, the sections are placed for 10 minutes in carbolic-fuchsine, and decolorized for 24 hours in fluorescine alcohol (yellow fluorescine, 1 Gm. rubbed in a mortar with 50 Cc. of absolute alcohol, and allowed to settle). Stain the nuclei with *Ehrlich's* hematoxylin and counter-stain faintly with benzopurpurine solution (0.25 Gm. in 20 Cc. alcohol and 80 Cc. distilled water).

Plessy-Matthieu (GLUCOSE; SUGAR; PYROGALLOL). See *Matthieu-Plessy.*

Plugge (ALBUMIN). Reagent used in *Plugge's* test for phenol yields a red color with albumin, similar to that produced by *Millon's* reagent for albumins and phenols.

Plugge (AMMONIAC). Dissolve 30 Gm. NaOH in water, keep solut. cool while adding 20 Gm. bromine, and then dilute to 1 liter. A drop of this solution, added to an aqueous or alcoholic solut. of ammoniac prepared with the addition of NaOH, causes a beautiful violet color which rapidly disappears.

Plugge (NITROUS ACID). A red color develops on heating to boiling 5 Cc. of a solut. of mercurous nitrate with 5 Cc. carbolic acid (1: 100), and 15 Cc. water, then adding 120 to 150 Cc. of a liquid containing nitrous acid.

Plugge (PHENOL). Boil a dil. solut. with mercurous nitrate-solut. containing a slight trace nitrous acid. Phenol causes appearance of an intense red color, while metallic mercury separates out and an odor of salicylol develops. See *Fresenius'* phenol reaction.

Podwyssotzki (EMETINE). A drop sat. solut. of sodium phospho-molybdate in conc. H_2SO_4 yields with emetine a brown color, which changes to blue on adding a drop HCl.

Podwyssotzki (FIXING MIXTURE). Mix 15 Cc. 1-% chromic acid dissolved in 0.5-% corrosive sublimate solut., 4 Cc. 2-% osmic-acid solut., and 6 to 8 drops glacial acetic acid.

Podwyssotzki (SAFRANINE STAIN). After staining, differentiate for two minutes or less in a strongly alcoholic picric-acid solut. followed by pure alcohol.

Poehl (PRODUCTS OF ASIATIC CHOLERA BACILLI). Add 10 drops conc. H_2SO_4 to 7 Cc. pure culture of comma-bacillus—a rose color deepening to purple develops. (Indol reaction; other bacteria also elaborate indol, but comma-bacillus and one or two others elaborate nitrous acid also, which is necessary for the reaction.)

Poelzam (IMBEDDING MASS). Cut good white soap in thin slices, dry in the sun, powder, and mix into a paste with spirit. Next mix paste with 90-% alcohol and glycerin in such proportions that the whole shall contain for every 10 parts by weight of soap, 22 parts of glycerin and 35 parts of alcohol. Let the whole simmer until a transparent, syrupy fluid is obtained. This mass may be removed from sections by means of water or very dilute alcohol.

Pohl (PICRIC ACID). A woollen thread is colored yellow on soaking in a picric-acid solut. and rinsing in water.

Pohl (PRECIPITANT FOR GLOBULIN). Make alkaline with NH_3, and filter after several hours, then add to filtrate equal volume sat. solut. ammonium sulphate—a ppt. forms if globulin present.

Poli (SERIAL SECTIONS). Arrange sections on a layer of melted Kaiser's gelatin, add glycerin, and cover.

Poli-Papasogli (CITRIC, SUCCINIC, AND MALIC ACIDS). See *Papasogli-Poli.*

Pollacci (ALBUMIN IN URINE). Reagent is a solut. of tartaric acid, 1; $HgCl_2$, 5; NaCl, 10; water, 100; formaldehyde (40-%), 5. To test sample put 2 Cc. solut. in test-tube and overlay with 3 or 4 Cc. urine—a ring appears immediately at line of separation of the liquids if pathological albumin present. If the ring appears slowly (10 to 15 minutes) urine is pathologically right. Test sensitive to 1 : 370,000, according to author.

Pollacci (GLUCOSE). Shake liquid with 4 Cc. water, 1 drop aqueous solut. ferric chloride, and 6 drops solut. of soda; boil, add 2 drops H_2SO_4, cool, and add a fresh solut. potassium ferricyanide. Glucose produces a blue color.

Pollacci (IODATES IN IODIDES). Heat alkaline liquid, and add a piece phosphorus, which will soon be surrounded by a dark-yellow zone. Amorphous phosphorus promptly reduces iodates to iodides.

Pollacci (PHENOL). 1.—An aqueous solut. containing phenol overlaid on H_2SO_4 causes a red color at the line of contact. 2.—A brown color is produced on adding a drop of liquid to H_2SO_4 and potassium bichromate.

Pollacci (SULPHURIC ACID IN VINEGAR). Immerse strips of filter-paper in a beaker containing the vinegar, so that one end of each touches the bottom and the other projects about 1 Cm. above the top. After 24 to 36 hours, cut off projecting portions of strips, moisten with ether, and when that has evaporated take up the soluble matter with water and examine for H_2SO_4.

Pollak (MELANIN). See *Von Jaksch's* test.

Pollet (REAGENT). *Kopp's* reagent.

Porret (FERRIC SALTS). A blood-red color develops on adding solut. potassium sulphocyanide.

Posner (PEPTONE AND ALBUMINS IN URINE). The urine, made alkaline, is poured into a test-tube and carefully overlaid with very dilute, almost colorless copper-sulphate solut.—peptone causes the formation of a violet zone in the cold; albumin gives the same reaction upon warming. See also *Brucke's* and *Rose's* biuret reactions.

Potain-Drouin (CARBONIC OXIDE IN AIR). Pass current of air in very fine bubbles through 10 Cc. of 10-% solut. palladium chloride acidulated with 2 drops HCl—if carbonic oxide present in air, a black film of palladium is deposited on sides of flask and tube.

Pouchet (BLEACHING METHOD). Macerate sections in glycerin to which a little hydrogen dioxide has been added (5 or 6 drops to a watch-glassful).

Poutet (FIXED OILS). Mix 10 Gm. oil, 5 Gm. HNO_3 (of 40° to 42° Bé.), and 1 Gm. mercury; shake 3 minutes till mercury dissolved, allow to stand 20 minutes, and again shake 1 minute. Various fats show differences in color and in the time they take to solidify. Olive and peanut oils harden most rapidly. In one modification of this elaïdin reaction the proportions used are 50 Cc. of oil, 12 Gm. of mercury, and 15 Gm. of nitric acid (sp. gr. 1.35). Olive and almond oils only are solidified by this. Another modification, recommended more particularly for determining purity of olive oil, is to mix

the oil with one-twelfth its weight of a solut. of 6 Gm. mercury in 7.5 Gm. HNO_3 (sp. gr. 1.35). Shake every 10 minutes for 2 hours, then put in a cold cellar and observe consistence after 24 hours.

Power (ELATERIN). A deep-red color develops on adding H_2SO_4, while addition of potassium bichromate causes a brown to light-green color.

Power (EMETINE). A bright-orange to lemon-yellow color develops on adding solut. chlorinated lime and 1 drop acetic acid.

Power (GLUCOSE). A colorless solut. is obtained on heating the liquid to boiling with 1 drop copper-sulphate solut. (1:14) and a slight excess ammonia.

Pradines (FUCHSINE IN WINE). Distil off alcohol and to 10 Cc. of residue add 4 Cc. ammonia; shake well with 5 Cc. ether and separate. A drop of the ethereal layer placed on white paper or muslin gives a rose-red stain if fuchsine present. If desired, the residue left after distillation may be shaken with a sat. solut. of ammonia in ether.

Pratesi (GLUCOSE IN URINE). Potassium hydrate, 2.5 Gm.; solut. potassium silicate (conc.), 60 Gm.; potassium bichromate, 2 Gm. Allow 5 drops of reagent to dry on strip of tin; on heating, tin becomes yellow. Add urine—if glucose present, a green color develops on heating.

Prescott (CARBOLIC ACID). A yellow color develops on adding a few drops HNO_3, then a slight excess of KOH, and diluting with water.

Prescott (SULPHOCARBOLATES). A yellow color develops on boiling in water with HNO_3 and neutralizing with KOH.

Preusse-Baumann (HYDROQUINONE). See *Baumann-Preusse.*

Preyer (CARBON MONOXIDE IN BLOOD). 3 to 4 drops of suspected blood are warmed for 5 minutes at 30° C. with 10 Cc. water and 5 Cc. potassium-cyanide solut. (1:2). The spectrum of normal blood, so treated, lacks the absorption line of oxyhemoglobin, and in its place shows a broad absorption band; the spectrum of carbon-monoxide blood remains unchanged.

Price (IODINE). A blue color develops on mixing with starch and adding HCl and solut. potassium nitrite.

Pritchard (HARDENING FLUID). Dissolve 1 part chromic acid in 20 parts water and add 120 parts alcohol.

Pritchard (REDUCING SOLUTION). An aqueous solut. containing 1% each of amyl alcohol and formic acid. Used for reducing gold chloride after impregnating animal tissues with that salt.

Prochazka-Endemann (COPPER). See *Endemann-Prochazka.*

Procter (CANNABIS EXTRACT). HNO_3 converts the extract into an orange-red resin.

Proctor (TANNIC AND GALLIC ACIDS). A green color develops on adding a faintly alkaline solut. of sodium or potassium arsenate, and a purplish-red on adding acids.

Proescher (BILIRUBIN IN URINE). Saturate 10 Cc. urine with $(NH_4)_2SO_4$, collect ppt. and exhaust it with 96-% alcohol. Acidulate alcoholic extract and treat it with a diazo solut. prepared by mixing a solut. of (*a*) sulphanilic acid (*Erhlich*) 5 Gm., or paramidoacetophenone (*Brunner*) 0.5 Gm., HCl 50 Gm., and water 1,000 Gm., with a solut. of (*c*) $NaNO_2$ 5 Gm., in water 1,000 Gm. If bilirubin present, solut. acquires a blue color. Bilirubin may thus also be detected in serum.

Proksch (RHUBARB IN URINE). 1.—Add to urine HCl, then xylene, and shake. Overlay xylene solut. on KOH lye—if rhubarb present a pink color develops at contact-point of liquids. 2.—The same test conducted with chloroform instead of xylene gives a violet zone. 3.—If SO_3 be added to urine, mixture shaken with chloroform, and chloroformic solut. overlaid on potassa lye, pink zone forms. 4.—Shake urine with sulphanilic acid and xylene—lower aqueous layer will be wine-red, while upper xylene layer will be faint pink if rhubarb present. Senna may give similar reactions, though in less degree.

Prollius (SOLUTION). Mixture of 88 parts ether, 8 parts of absolute alcohol, and 4 parts of spirit of ammonia; for extracting cinchona bark for the determination of alkaloids.

Purdy (GLUCOSE). 4.15 Gm. copper sulphate, 10 Gm. mannite, 20.4 Gm. KOH, 300 Cc. ammonia (sp. gr. 0.88), 50 Gm. glycerin, and enough water to make 1 liter. 25 Cc. will be reduced by 0.015 Gm. grape sugar. See also *Fchling's* solution.

Purgotti (COPPER). A blue color develops on mixing the solut. with an alkaline chloride and overlaying with tincture of guaiac.

Pusch (BENZENE AND BENZIN). Iodine gives a violet solut. with benzene, and raspberry-red with benzin.

Pusch (CITRIC AND TARTARIC ACIDS). On heating 1 Gm. powdered substance on a water-bath, with 10 Gm. H_2SO_4, citric acid turns lemon-yellow; tartaric acid becomes brown or black.

Puscher (ALCOHOL IN ETHEREAL OILS). A few drops ethereal oil are introduced into a test-tube, and the upper portion of tube dusted with powdered fuchsine, or the latter is introduced by means of a cotton swab. Upon boiling, the alcohol, evaporating first, dissolves the fuchsine and forms a red solution.

Puscher (ARSENIC IN GREEN COLORS). Ammonia gives a blue color, and when evaporated the solut. leaves a dirty yellowish-green stain. A pale-blue stain indicates absence of arsenic.

Puscher (FUCHSINE IN FRUIT JUICES). A woollen or silk thread soaked in the juice and then rinsed in water is colored red.

Quirini (GLUCOSE IN URINE). Add 10 drops urine to 5 Cc. 0.5-% solut. of orthonitrophenylpropiolic acid in soda lye and boil ½ minute—if sugar present (even 0.1%) urine acquires a dark-blue color (formation of indigo). Normal urine so treated is at most colored green. See also *Hoppe-Seyler's* test.

Raabe (ALBUMIN IN URINE). Trichloracetic acid (sat. solut.) overlaid on the cold urine coagulates albumin, but not mucin or peptones. When crystallized trichloracetic acid is added to urine it sinks to the bottom of the liquid and is dissolved, forming a turbid zone.

Rabl (ALUM COCHINEAL). Practically identical with *Czokor's* cochineal alum-carmine.

Rabl (CHLORO-FORMIC ACID). Add 4 or 5 drops of conc. formic acid to 200 Cc. of 0.33-% chromic-acid solut. *Squire* gives the following formula: 7 Cc. 10-% chromic-acid solut., 200 Cc. water, and 5 drops formic acid (sp. gr. 1.2). The mixture must be freshly prepared at the moment of using and small pieces of tissue should be fixed in it for 12 to 24 hours, then washed with water, hardened in alcohol of gradually increasing strength, and stained with Delafield's hematoxylin or safranine. This is one of the best reagents for the study of karyokinesis.

Rabl (PICRO-SUBLIMATE). Mix 1 volume each of sat. solut. mercuric chloride and picric acid, and add 2 volumes dist. water. Embryos may be left to harden in this for 2 hours, prior to removal into weak alcohol.

Rabl (PLATINO-SUBLIMATE MIXTURE). Mix equal volumes of 1-% platinic chloride solut., sat. mercuric-chloride solut., and distilled water. This is used for hardening embryos of vertebrates and for other objects.

Rabl (PLATINUM FIXING SOLUTION). Leave objects 24 hours in aqueous solut. platinic chloride (1:300), then wash with water, harden in alcohol and cut sections. Stain with Delafield's hematoxylin or safranine.

Rabl (SERIAL SECTIONS). Secure sections to slides by employing a modified Schaellibaum solut. (2 parts collodion and 3 parts clove oil).

Rabl (STAINING METHOD). Stain very lightly with dil. Delafield's hematoxylin solut. for 24 hours, wash out first with water, then with alcohol acidulated with HCl, next strain for some hours in Pfitzner's safranine, and wash out with pure alcohol.

Rabourdin (IODINE). If to a liquid containing iodine 2 drops HNO_3, 15 drops of H_2SO_4, and a little chloroform be added, a violet color will be imparted to the chloroform.

Rabuteau (BROMIC AND CHLORIC ACIDS IN URINE). Add a little indigosulphonic acid to urine, followed by H_2SO_4—the indigo is decolorized by any chlorine or bromine produced by reduction of chloric or bromic acid.

Rabuteau (HYDROCHLORIC ACID IN GASTRIC JUICE). Starch solut., 50 Cc.; potassium iodate, 1 Gm.; and potassium iodide, 0.5 Gm. The reagent turns blue with free HCl.

Rafaele (ALBUMIN IN URINE). Use HCl instead of acetic acid in *Spiegler's* test, which see.

Ralfe (ACETONE IN URINE). Boil 4 Cc. KOH solut. containing 1.5 Gm. KI and overlay with 4 Cc. urine—if acetone present contact zone is yellow, with specks of iodoform. Lactic acid and some other substances also give the reaction.

Ralfe (PEPTONES IN URINE). Overlay Fehling's solut. with equal vol. urine—if peptones present a rose-colored halo above zone of phosphates appears.

Ramsay (BLEACHING SOLUTION). Solut. magnesium hypochlorite, also known as *Crouvelle's* bleaching fluid.

Ramsay (CARBONYL CHLORIDE IN CHLOROFORM). Add clear baryta water to chloroform and let stand some hours in a stoppered vessel—if carbonyl chloride present a white film (barium carbonate) forms at junction of the liquids. (Carbonyl chloride may be removed from chloroform by shaking latter with slaked lime.)

Randolph (PEPTONES IN URINE). To 5 Cc. cold, faintly alkaline urine add 2 drops sat. solut. KI and 3 or 4 drops Millon's solut.—a yellow ppt. forms if peptones present. Sensitive to 1 : 17,000. Biliary acids also give reaction.

Ransom-Dunstan (ALKALOIDS IN BELLADONNA). See *Dunstan-Ransom.*

Ranvier (ABSOLUTE ALCOHOL). Alcohol, absolute enough for most purposes, may be obtained by treating 95-% alcohol with calcined cupric sulphate for several days, repeating operation with fresh sulphate several times until it ceases to become conspicuously blue, and no particles of water become visible when a drop of alcohol mixed with turpentine is examined under the microscope.

Ranvier (AMMONIA CARMINE). Dissolve carmine in water with a slight excess NH_3, and expose solution to air until entirely dried up. The residue is then dissolved in distilled water and the solut. filtered.

Ranvier (CARMINE-GELATIN INJECTION). Soak 5 Gm. gelatin in water until quite swollen and soft (about ½ hour), wash, drain, and melt on a water-bath. Then add slowly a solut. prepared from carmine, 2.5 Gm. and a little water, using just enough NH_3 to afford a transparent solut. Next neutralize by cautiously adding by drops, with continuous agitation, a mixture of 1 part glacial acetic acid and 2 parts water. Care must be taken to avoid formation of a granular ppt. on adding the excess of acid. Finally strain through flannel.

Ranvier (DECALCIFYING LIQUID). 50-% HCl with sufficient NaCl to counteract its swelling action.

Ranvier (FORMIC-ACID METHOD). Thoroughly impregnate tissues in a mixture of 4 parts 1-% gold-chloride solut. and 1 part formic acid which has been boiled and allowed to cool.

Then reduce the gold by action of daylight, in acidulated water, or in the dark, in 20-% formic acid.

Ranvier (IODIZED SERUM). Iodine is added to the recent amniotic liquid of mammals, and the mixture agitated for several days. Or, serum is mixed with a large proportion of tincture iodine and the ppt. removed by filtration. The resulting strong serum is kept in stock and a little added every 2 or 3 days to the serum intended for use.

Ranvier (LEMON-JUICE METHOD). Soak pieces of fresh tissue in fresh lemon juice until transparent (5–10 minutes), then rapidly wash in dist. water, treat for 10 to 60 minutes with a 1-% gold-chloride solut., again wash, and expose to light in a bottle containing 50 Cc. dist. water and 2 drops acetic acid. Reduction is complete in 24 to 48 hours. If it is not desired to retain the superficial epithelium, reduction may be more completely effected in the dark by treatment with formic acid (sp. gr. 1.2) diluted with 3 volumes water. The lemon juice in this process may be replaced by an aqueous solut. citric acid (40 grains to each fl. oz.).

Ranvier (ONE-THIRD ALCOHOL). This mixture (2 parts dist. water and 1 part 90-% alcohol) is known in France as "Alcool au tiers"; in Germany as "Drittelalcohol" or "Ranviersche alcohol dilutus"; in Italy as "Alcool al terzo." It is a very mild fixative, and objects should not be left in it for more than 24 hours. They may then be stained with picrocarmine, alum-carmine, or methyl-green.

Ranvier (PICRO-CARMINE). Water, 1,000; picric acid, 20; carmine, 10; ammonia, 50. Keep in a stoppered bottle in a warm place for 2 to 3 months, then expose in a large dish until liquid reduced to four-fifths its original volume. Then remove the crystals that have formed, dry, and dissolve in a little warm water. If, after filtration, the carmine does not appear to be dissolved, when examined under the microscope, add more water and NH_3, and expose as before. When carmine properly dissolved, evaporate filtered solut. to dryness, and reduce residue to powder. For staining, dissolve 1 Gm. of the powder in 100 Gm. water, and add a crystal thymol to prevent mold.

Ranvier (PRUSSIAN-BLUE INJECTION). Mix conc. soluts. ferrous sulphate and potassium ferrocyanide by pouring former into the latter, taking care to have an excess of latter. Filter off liquid and wash ppt. with dist. water until it becomes soluble, then make a conc. solut. of it. Soak 1 part gelatin in water for half hour, wash, melt, and add gradually to 25 parts of blue solut. heated to same temperature, stirring continually with a glass rod until curdy ppt. first formed disappears. Then filter through flannel and keep at 40° C. on a water-bath until injected. The soluble Prussian blue prepared as above is sometimes used without gelatin, or it may be mixed with one-fourth glycerin.

Ranvier (SILVER-NITRATE INJECTION). Mix 2, 3, or 4 parts conc. solut. gelatin with 1 part 1-% solut. silver nitrate.

Ranvier-Vignal (OSMIUM MIXTURE). Fix tissues in a freshly made mixture of equal volumes 1-% osmic acid and 90-% alcohol, then wash out in 80-% alcohol, next with water, and stain for 48 hours with picro-carmine or hematoxylin. This method has been applied to the histology of insects.

Raspail (ALBUMINOIDS). These are colored red by sugar and conc. H_2SO_4. See also *Schultze's* furfurol reaction.

Raulin (CULTURE MEDIUM). Rock candy, 0.7 Gm.; tartaric acid, 0.04 Gm.; ammonium nitrate, 0.04 Gm.; ammonium phosphate, 0.6 Gm.; potassium carbonate, 0.6 Gm.; magnesium carbonate, 0.4 Gm.; ammonium sulphate, 0.25 Gm.; zinc sulphate, 0.07 Gm.; ferrous sulphate, 0.07 Gm.; potassium silicate, 0.07 Gm.; water, 1,500 Gm.

Rauwerda (CYTISINE). A drop of nitrobenzene containing a little dinitro-thiophene gives a quite persistent violet-red color with cytisine or its salts. 0.0005 Gm. cytisine may be recognized. Coniine alone gives similar reaction, but color fades rapidly.

Rawitz (HEMATEIN STAIN). Add 1 to 3 drops of strong alum-hematein solut. to 25 or 50 Cc. distilled water, and stain sections of picric or sublimate material in the mixture for 24 to 48 hours.

Rawitz (INVERT STAIN). Place sections fixed in Flemming's liquid or some other chromic mixture in a 20-% aqueous solut. or tannin for 24 hours. Then wash and treat for 2 or 3 hours

with a 1- to 2.5-% solut. of tartar emetic, kept at a temperature of 37° C., or for 24 hours with the same solution at the normal temperature. Again wash and stain for 24 hours with safranine, fuchsine, methyl violet, gentian violet, or emerald green. Differentiate with alcohol or by treatment for 2 to 24 hours with 2.5-% tannin solution, then clear and mount.

Raymondi-Bertoni (NITROUS ACID IN BLOOD). See *Bertoni-Raymondi.*

Read (CARBOLIC ACID AND CREOSOTE). Strong solut. of ammonia dissolves carbolic acid, but not creosote.

Reale (FREE HYDROCHLORIC ACID). In a solut. ferric chloride containing free HCl, a 1-% solut. carbolic acid gives a greenish color. If free acid absent, an amethyst color appears; a large quantity of acid prevents coloration.

Redenbaugh (NARCOTIZATION METHOD). Add crystals of magnesium sulphate to water containing marine animals until a sat. solut. is obtained; or, in the case of annelids, throw them into a sat. solut. of the salt.

Redwood (ALCOHOL IN ESSENTIAL OILS). Addition of HNO_3 is followed by evolution of nitrous fumes.

Ree (PRECIPITANT FOR ALBUMIN). Alcoholic tannin solution.

Rehm (STAINS FOR NERVE CELLS). 1.—Wash sections for a few minutes in aqueous solut. Congo red, then in alcohol, and afterwards treat for 10 minutes (until they become blue) with alcohol acidulated with HCl or HNO_3. Clear with origanum oil and mount. 2.—Place sections of alcohol-hardened material in a 0.5-% aqueous solut. of hematoxylin for 1 or 2 days, wash in aqueous solut. lithium carbonate until no more color comes away, then dehydrate and mount. After-stain, if desired, for a few minutes with 0.1-% aq. solut. Bismarck brown.

Rehm (STAINS FOR AXIS CYLINDERS). 1.—Stain sections of alcohol-hardened material for 5 minutes in 1-% ammonia-carmine, wash out in 70-% alcohol acidified with 1-% HNO_3, then with pure alcohol; stain for half a minute in 0.1-% methylene-blue solut., differentiate in alcohol, clear in origanum oil, and mount in colophonium. 2.—Employ a modification of Nissl's method, in which sections of alcohol-hardened

material are stained for half a minute to a minute in hot 0.1-% methylene-blue solut., wash in 96-% alcohol till no more color comes away, clear with origanum oil, and mount in balsam or benzene-colophonium.

Reich (CANE SUGAR). Cobalt-nitrate solut. and KOH or NaOH when added to solut. of cane sugar develop a violet color. According to Dupont, glycerin, milk sugar, glucose, and invert sugar do not interfere with the reaction, but dextrin and gums should be removed by pptng. with lead acetate or baryta water.

Reich (GLUCOSE). 1.—No violet color or ppt. is formed on adding KOH and boiling, then adding cobalt nitrate. 2.—No color reaction is given on adding boiling solut. of potassium bichromate.

Reichardt (ARSENIC IN URINE). 1.—To 200 Cc. urine add 2 Gm. NaOH and evaporate off liquid; then dissolve residue in a little water acidulated with HCl and test in Marsh's apparatus. 2.—Saturate slightly acidulated urine with H_2S, collect ppt. in 12 to 14 hours, and wash ppt. and filter with bromine water to dissolve As_2S_3. Place washings in Marsh's apparatus, and pass evolved gas into a solut. $AgNO_3$ 0.1 to 0.2 Gm., and HNO_3 2 Gm., in water 10 Cc. Any AsH_3 formed causes a black-brown ppt. of metallic As, or latter forms at tip of immersed tube.

Reichardt (IODIC ACID). On mixing a solut. of an iodate with a solut. of morphine sulphate containing a few drops H_2SO_4 a brown ppt. (of iodine) or a yellowish-brown color, according to quantity of iodic acid present. A little NH_3 added after reaction commences increases sensitiveness of reaction, and renders color more permanent. For details, see MERCK'S REPORT, IX, p. 517.

Reichardt (NITRIC ACID). Upon treating a solut. of brucine in H_2SO_4 with a few drops solut. containing HNO_3, a rose-red to deep-red color develops. Or, to 1 drop of the water add 3 drops of brucine solut. and a few drops H_2SO_4—color appears even in dilutions of 1 : 100,000.

Reiche (ACACIA). Boiling with a solution of orcine in HCl causes a red to violet color and a blue ppt., which dissolves in alcohol with a greenish-blue color. Alkalies change the latter color to violet with greenish fluorescence.

Reichert-Meissl (FOREIGN FAT IN BUTTER). Weigh into a flask 5 Gm. melted butter, add 2 Cc. of 50-% NaOH solution, and 30 Cc. alcohol. The fat is then saponified under a reflux condenser by brisk boiling for 20 minutes. The spirit is then boiled off, the last traces being carefully driven off. 100 Cc. of hot water are then added, the soap dissolved, 40 Cc. of dilute H_2SO_4 are next added, and 110 Cc. of liquid is slowly distilled over. 100 Cc. of this are then titrated with decinormal soda, using phenolphtalein as an indicator. Pure butter contains volatile fatty acids, which use up from 24 to 32 Cc. of decinormal alkali for 5 Gm. taken.

Reichert-Meissl (NUMBER). Indicates the number of Cc. of decinormal NaOH or KOH solut. required to neutralize the volatile fatty acids obtained by a special process from 5 Gm. of a fat. *Reichert's* numbers formerly in vogue gave the figures for 2.5 Gm. of fat, and are therefore only half as large as the *Reichert-Meissl's* numbers.

Reichl (GLYCERIN). 1.—Equal parts of glycerin and carbolic and sulphuric acids are mixed and heated to 120° C., and water added to the brownish-yellow, solid mass after cooling. NH_3 is then added drop by drop, when the mass dissolves, forming a beautiful carmine-red solut. 2.—A violet-red color develops on boiling glycerin with an equal volume water, a little pyrogallic acid, and a few drops H_2SO_4, then adding stannic chloride.

Reichl-Mikosch (ALBUMIN). If 2 to 3 drops of alcoholic benzaldehyde solut. are added to solut. to be examined, then a larger volume of dil. H_2SO_4 (1 : 1), and finally a few drops of Fe_2Cl_6, a deep-blue color develops if albumin present. Reaction hastened on warming.

Reinke (FLEMMING'S ORANGE METHOD). In this modification of Hermann's liquid, sections are left for 24 hours in conc. K_2SO_3 solut. Then wash with water and stain for 1 to 2 hours with safranine, wash well in water, and stain for 24 hours with a conc. aqueous solut. gentian violet to which a few drops of a similar solution of orange G. have been added. Differentiate rapidly with alcohol and clear with clove oil.

Reinsch (ARSENIC TEST). A solut. of arsenous or arsenic acid in HCl is reduced by metallic Cu, a gray coating of copper

arsenide being deposited upon the metal. Sb and Hg behave similarly, hence their absence must be proved before the presence of As can be decided upon. Test is also known as *Hager's* empirical arsenic test (kramato method).

Reinsch (SULPHUROUS ACID). A brown or black stain is produced on copper by H_2SO_3 in the presence of HCl.

Reissner (NUCLEO-ALBUMIN IN URINE). Filter urine, dilute, and add excess of acetic acid—turbidity indicates presence of nucleo-albumin.

Remak (SOLUTION FOR HARDENING MICROSCOPICAL PREPARATIONS). 50 Cc. 20-% aqueous $CuSO_4$ solut., 50 Cc. 25-% alcohol, and 35 drops of purified pyroligneous acid.

Remsen (SACCHARIN IN PRESENCE OF SALICYLIC ACID). Ethereal extract is evaporated, the residue dissolved in water, neutralized with soda, and mercuric nitrate added in slight excess. The ppt. is tested for saccharin, after drying, by *Boernstein's* method.

Renard (PEANUT OIL). Test depends upon isolation of arachic acid (melting-point 74° to 75° C.) in the form of the lead salt, which can be separated from lead oleate by extraction with ether. For details see *Chem. Ztg.*, 1895, p. 451.

Renaut (GLYCERIN HEMATOXYLIN). To a sat. solut. potassa alum in glycerin add a sat. solut. of hematoxylin in 90-% alcohol drop by drop, so as to form a deeply colored solut. Expose to daylight for a week, then filter. This solut., like Renaut's hematoxylic eosine, may be used for mounting unstained sections, which after some time absorb the color from the liquid and become stained.

Renaut (HEMATOXYLIC EOSINE). 30 Cc. conc. aq. solut. eosine, 40 Cc. sat. alcoholic solut. hematoxylin (which has been kept for some time and pptd.), and 130 Cc. sat. solut. potassa alum in glycerin (sp. gr. 1.26). Stand for 5 or 6 weeks in a partially covered vessel, protected from dust, until alcohol is evaporated, then filter. The filtrate can be diluted with glycerin if desired. Mount objects in this fluid diluted with 1 or 2 volumes glycerin, or stain separately for some days or weeks, and mount in balsam, after washing in alcohol charged with a sufficient quantity of eosine.

Renaut (SILVER METHOD). For the study of lymphatics stain tissues with a 1-% solut. of $AgNO_3$ mixed with (1) 3 or 4 parts of a mixture of 80 parts sat. solut. picric acid and 20 parts of a 1-% osmic acid solut., or (2) with 4 parts of a mixture of 4 parts picric-acid solut. and 20 of osmic-acid solut., with or without the addition of 1 % acetic acid to the mixture.

Renzone (KAIRIN IN URINE). Add solut. Fe_2Cl_6. A dark-violet or reddish-brown color develops changed by H_2SO_4 to light-red.

Reoch (OXALIC ACID IN URINE). Calcium oxalate is pptd. on the addition of alcohol.

Resegotti-Martinotti (SAFRANINE-METHOD). See *Martinotti-Resegotti.*

Reuss (ATROPINE). Heat with H_2SO_4 and some oxidizing substance—odor of blossoms develops.

Reuter (PARA-AMIDOPHENETOL IN PHENACETIN). Melt phenacetin with pure chloral hydrate—a violet color indicates presence of amidophenetol. (Even the purest commercial specimens show a slight rose tint.)

Reynold (ACETONE IN THE URINE). Shake distillate from urine with freshly pptd. HgO (from $HgCl_2$ and KOH). If acetone present, the filtrate will contain acetone-mercury in solution and will respond to tests for mercury.

Reynold-Gunning (ACETONE IN URINE). Add recent yellow mercury oxide to urine, filter, and overlay filtrate with ammonium sulphide—black ring of mercury sulphide forms.

Reynoso (IODINE). Heat mixture of barium peroxide, water, starch paste, and HCl until gas begins to evolve, then add the liquid—a blue color develops if iodine present in latter.

Rheoch (FREE MINERAL ACIDS). See *Mohr's* test.

Rhien (FIXED OILS IN ESSENTIAL OILS). Pass steam through the oil till it distils over, and shake residue with ether, which will take up fatty matter.

Ribbert (CAPSULE STAIN). Immerse cover-glass preparation rapidly in Ribbert's solut. and immediately rinse in water. Bacilli stain dark, while the capsules are light blue.

Rice (CARBOLIC ACID). Place 10 Gm. $KClO_3$ in a test-tube, cover with an inch layer of HCl, and add 1½ volumes of water. After removing most of the gas evolved, by blowing through a glass tube, pour NH_3 cautiously on the surface of the mix-

ture, and then a few drops of the suspected liquid. If carbolic acid present the ammoniacal layer will be brown to rose-red.

Richardson (NAPHTOL). Dissolve 0.04 Gm. naphtol and 0.5 Cc. of normal NaOH solut. in 1 or 2 Cc. water, then add 0.05 Gm. of sulphanilic acid dissolved in 5 Cc. of normal NaOH solut., and 0.02 Gm. $NaNO_2$ dissolved in 5 Cc. normal H_2SO_4. Under those conditions α-naphtol gives a dark blood-red color, changing to brown on adding diluted H_2SO_4; β-naphtol develops a reddish-yellow color.

Richardson (SERUM PAPER). Paper saturated with the serum of typhoid patients and dried may be used for *Widal's* reaction instead of fresh serum.

Riche-Bardy (METHYL ALCOHOL IN ALCOHOL). Mix 10 Cc. of the sample 15 Gm. iodine and 2 Gm. amorphous phosphorus, and distil the iodides into 30 Cc. water. Separate and mix with 5 Cc. aniline, kept cool in a flask; after an hour add water and excess of NaOH and boil. Take 1 Cc. of the oily layer which rises to the surface and mix with 10 Gm. of a mixture of clean sand, 100 parts; salt, 2 parts; copper nitrate, 3 parts; heat in a glass tube to 90° C. for 8 hours, then exhaust with warm alcohol, filter, and make up to 100 Cc. with more alcohol. If no methyl alcohol is present the color is red, if a trace of methyl alcohol is there the tint will be more or less violet, and will give a standard color to a skein of white wool.

Richmond (NITRIC ACID). Mix solut. to be tested with conc. H_2SO_4 and when cool overlay on conc. $FeSO_4$ solut. The presence of HNO_3 is indicated by a reddish color changing to purple and brown. Also called *Desbassin's* reaction.

Richmond-Boseley (FORMALDEHYDE). Fluids containing formaldehyde when boiled with a solut. diphenylamine in water and the necessary volume H_2SO_4, yield a white flaky ppt. Presence of HNO_3 or nitrates is indicated by the resulting green color. See *Hehner's* reaction.

Richter (INDICATOR). Potassium dichromate. Gives with alkalies a reddish-yellow color; with acids a pale-yellow.

Rideal (ANTIMONY, ARSENIC, AND TIN). These elements in minute quantities are detected by means of electrolytic couples of platinum-iron, copper-platinum, and zinc-gold. See *Chemical News*, LI, p. 292.

Rideal (HYDROLYSIS OF BUTTER FAT). Heat melted butter with H_2SO_4, and then after destroying the H_2SO_3 formed by permanganate, distil off the volatile fatty acids, which titrate as in the *Reichert-Meissl* process of butter analysis. (See *Analyst*, XVIII, p. 165.)

Rideal-Green (NITROUS ACID). A volumetric method based upon the diazo reaction with aniline. Determinations of HNO_2 with less than 0.1% error can be made even in presence of reducing agents when permanganate is obviously inadmissible. See *Chemical News*, XLIX, p. 173.

Rideal-Rosenblum (COMPOUNDS OF CHROMIUM). A method based upon fusion with sodium peroxide. For precautions and details necessary in order to insure accurate results, see *Journ. Soc. Chem. Ind.*, 1896, p. 1017.

Rideal-Stewart (TOTAL PROTEIDS). By precipitating an aqueous solut. of a meat extract by chlorine, a ppt. of constant composition is obtained, which can be dried over sulphuric acid or kjeldahled. (See *Analyst*, Aug., 1897.)

Ridenour (SALICYLIC ACID). H_2O_2 in the presence of an ammoniacal solut. of ammonium carbonate affords a red varying in intensity according to quantity of salicylic acid present. For details see MERCK'S REPORT, VIII, p. 513.

Riegel (FREE HYDROCHLORIC ACID IN GASTRIC JUICE). Moisten Congo-red paper with drop filtered gastric juice, or add drop of Congo-red solut. to latter—a blue color shows presence of free HCl. Also known as *Herzberg's* paper.

Riegler (ALBUMIN). 1.—Asaprol (calcium naphtolsulphonate), 8; citric acid, 8; dissolve in distilled water, 200. 10 Cc. of urine are mixed with 10 to 20 drops of the reagent. Traces of albumin are indicated by a turbidity; larger quantities by a ppt. Quantitative determination may be made with an albuminometer. 2.—10 Gm. β-naphtalinsulphonic acid are well shaken with 200 Cc. water and filtered. A turbidity or ppt. on adding 20 to 30 drops of reagent to 5 to 6 Cc. of fluid indicates presence of albumin. Sensitiveness 1 : 40,000. Albumoses and peptones react in a similar manner, but the ppt. disappears on warming, and reappears on cooling.

Riegler (ALBUMOSES AND PEPTONES). Dissolve 5 Gm. paranitraniline in 25 Cc. water and 6 Cc. conc. H_2SO_4, add 100 Cc.

water, then a solut. of sodium nitrite 3 Gm. in 25 Cc. water, and make up to 500 Cc. with water. Filter and preserve in the dark. Mix 10 Cc. reagent with 10 Cc. fluid to be tested, then add 30 drops 10-% solut. NaOH—if very small quantities of albumoses or peptones present a yellowish-orange color develops; with notable quantities a blood-red, even the froth on shaking being red. On now adding excess of H_2SO_4 an orange or brownish ppt. forms. For details, see MERCK's REPORT, IX, p. 24.

Riegler (ALDEHYDES AND GLUCOSE). Heat 0.1 Gm. phenylhydrazine hydrochlorate, 0.5 Gm. cryst. sodium acetate, and 1 Cc. sugar solut. until dissolved. When near boiling-point add 20 to 30 drops 10-% NaOH without shaking—in from a few seconds to 5 minutes, liquid becomes violet-red, even if not more than 0.005% sugar present. If no sugar present, color will be a slight pink. For sugar in urine, color must develop within 1 minute to afford physiological significance. Reaction also occurs with aldehydes, hence absence of these must be assured. According to Jolles, absence of albumin must also be assured. Reaction uninfluenced by uric acid and creatinine.

Riegler (BILIARY PIGMENTS). On adding an excess of paradiazonitraniline solut. to an alkaline solut. of bilirubin or biliverdin, intensely colored reddish-violet flocks are pptd., soluble in chloroform, alcohol, or benzene, and affording reddish-violet or violet soluts. For details see MERCK's REPORT, VIII, p. 269.

Riegler (INDICATOR). Diazoparanitraniline-guaiacol. Gives a red color with alkalies, and a greenish-yellow with acids.

Riegler (NITRITES). 1.—15 Cc. of the fluid to be examined are mixed in a test-tube with 0.02 to 0.03 Gm. of the naphtol reagent (equal parts naphtionic acid and pure beta-naphtol) and 2 to 3 drops conc. HCl, shaken, and 1 Cc. strong NH_3 poured down the side of the tube while held in a slanting position; presence of nitrites is indicated by appearance of a red zone, and on shaking the whole solution turns red. 2.—Naphtylamine sulphonic acid (naphtionic acid), 1 Gm.; beta-naphtol, 1 Gm.; sodium hydrate, 0.5 Gm.; water, 200 Cc. 10 drops of the solut. are used.

Riegler (URIC ACID). Para-nitraniline 0.5 Gm., water 10 Cc., pure conc. H_2SO_4 15 drops. Put into a glass flask of 150 Cc. capacity and heat with agitation until dissolved. Water 20 Cc. is now added, the mixture cooled quickly, $NaNO_2$ solut. (2.5-%) and 10 Cc. are added, and diluted, after 15 minutes, with water 60 Cc. The mixture is shaken up repeatedly and filtered. The formation of a blue or green color on adding the reagent and 10-% NaOH solut. indicates presence of uric acid.

Riegler (URIC ACID AND URATES). Add to 5 Cc. of liquid to be tested a small pinch phosphomolybdic acid, shake, then allow 10 to 20 drops conc. NaOH solut. to run in—if uric acid or a urate is present, an intense blue color develops. Sensitive in dilutions of 1 : 100,000. Guanin, alloxan, and alloxanthin also give the reaction.

Righini (MYRRH). Pure myrrh is dissolved by a solut. of an equal weight of NH_4Cl in 15 times as much water.

Riley (CHLORINE). Mix 1 part suspected substance, 1 part potassium bichromate, and 3 parts H_2SO_4 in a beaker, and suspend in this a smaller beaker containing ice. Chlorochromic acid is given off and condenses on the suspended beaker. On adding to the liquid a few drops NH_3 with an excess acetic acid and some solut. lead subacetate a yellow to orange color results.

Rimini (ALDEHYDES). A solution of the aldehyde in alcoholic potassa is heated with hydroxylaminephenyl-sulphonic acid. This results in the formation of benzyl-sulphonic acid and a hydroxamic acid containing the aldehyde residue. The latter compound can easily be separated, and yields an intense red-violet color with traces of iron chloride. This reaction is said to be exceedingly delicate.

Rimini (FORMALDEHYDE). Add 1 Cc. of a 1-% solut. phenylhydrazine hydrochlorate and 3 or 4 drops freshly prepared sodium-nitroprussiate solut. to 15 Cc. liquid, then make alkaline with conc. NaOH, and warm—if formaldehyde present, a marked blue color develops, changing to deep red. Milk thus tested turns blue to ash-gray, changing after 15 minutes to red.

Rindfleisch (TUBERCLE STAIN). Heat staining solut. until steam rises and bubbles appear on surface, then treat as in Koch-Ehrlich method.

Rinnmann (ZINC). Zinc oxide moistened with cobalt-nitrate solut. and strongly heated on charcoal, affords a green color.

Ripart (MOUNTING-MEDIUM). 75 parts camphor water, 75 parts distilled water, 1 part glacial acetic acid, 0.3 part cupric acetate, and 0.3 part cupric chloride.

Ripart-Pettit (PRESERVATIVE FLUID). Same as mounting-medium (vide supra). Objects fixed in this stain instantaneously with methyl green. Osmic acid or mercuric chloride may be added to increase fixing action.

Ritsert (GLYCERIN). Heat 1 Cc. glycerin to boiling with 1 Cc. NH_3, then add 3 drops 5-% $AgNO_3$ solut.—no change should occur in the liquid within 5 minutes. Test intended to show presence of arsenous acid, as well as of acrolein and formic acid; recent investigations, however, seem to have proved the test to be fallacious.

Ritsert (PHENACETIN). Boil 0.1 Gm. phenacetin 1 minute with 1 Cc. conc. HCl, then dilute with 10 Cc. water, filter after cooling, and treat filtrate with 3 drops 3-% chromic-acid solut.—liquid gradually assumes a ruby-red color.

Ritsert (SULPHONAL). Heat sulphonal with gallic or pyrogallic acid—odor of mercaptan develops.

Ritthausen (PROTEIN). A violet color develops on dissolving protein in dil. H_2SO_4, adding excess of KOH, and then a few drops sat. solut. $CuSO_4$.

Robbert-Hammarsten (THYMOL). See *Hammarsten-Robbert.*

Roberts (ALBUMIN IN URINE). Overlay urine on solut. of NaCl containing 5% HCl sp. gr. 1.052, or on a mixture of 5 parts sat. $MgSO_4$ solut. and 1 part of strong HNO_3; in both cases albumin is detected by formation of a white zone between the two liquids.

Roberts (GLUCOSE IN URINE). Add a little yeast to 60 or 70 Cc. urine and let ferment 24 hours. Compare specific gravity before and after fermentation—every degree lost represents 1 grain glucose per ounce, or 0.23%.

Roberts-Stolnikoff (ALBUMIN IN URINE). Depends on employment of *Heller's* test.

Robin (ALKALOIDS). Mix 1 part of substance with 2 parts cane sugar and add 1 or 2 drops H_2SO_4, stirring with a glass rod. Alkaloids give colors as follows: *Atropine*—violet, changing to brown; *codeine*—cherry-red, changing to violet; *morphine* — rose, rapidly changing to violet; *narcotine* — persistent mahogany color; *quinine*—greenish, bright-yellow, changing to dark coffee color with yellow margin; *salicin*—bright red; *strychnine*—reddish, changing to dark coffee color; *veratrine* —dark green.

Robinet (MORPHINE). A neutral solut. of a morphine salt gives with a dil. solut. of Fe_2Cl_6 containing some oxychloride a rapidly disappearing blue color.

Robinet (SALICYLIC ACID IN URINE). Ppt. urine with neutral lead acetate, remove excess of lead with dil. H_2SO_4, and at once add Fe_2Cl_6. If liquid has a red color (due to iron acetate) add H_2SO_4 until colorless or the purple salicylic-acid color appears.

Robins (GELATIN MASSES). Soak 1 part of gelatin in 7 to 10 parts water, and combine with one of the following coloring masses: 1.—*Carmine coloring-mass.* Rub 3 Gm. carmine with a little water and enough NH_3 to dissolve, then add 50 Gm. glycerin and filter. Then add by degrees a mixture of 5 Gm. acetic acid and 45 Gm. glycerin until slightly acid. Mix 1 part of this mixture with 3 to 4 parts gelatin vehicle. 2. —*Copper-ferrocyanide coloring mass.* Mix 20 Cc. conc. solut. potassium ferrocyanide and 50 Cc. glycerin, and add slowly, with agitation, to a mixture of 35 Cc. conc. solut. copper sulphate and 50 Cc. glycerin. At moment of injecting mix with 3 volumes of vehicle. 3.—*Modified Beale's Prussian-blue glycerin mass.* Mix 50 Cc. glycerin and 90 Cc. sat. solut. potassium sulphocyanide, and add to mixture of 3 Cc. solut., ferric chloride and 50 Cc. glycerin. Add next a few drops HCl, and mix with 3 volumes of vehicle. 4.—*Cadmium coloring mass.* Dilute 40 Cc. sat. solut. cadmium sulphate with 50 Cc. glycerin, and add a mixture of 30 Cc. sat. solut. sodium sulphide with 50 Cc. glycerin, then combine with 3 volumes of vehicle. 5.—*Scheele's-green coloring mass.* Mix 80 Cc. sat. solut. potassium arsenite and 50 Cc. glycerin, and add 40 Cc. sat. solut. copper sulphate mixed with 40 Cc. glycerin, and combine with 3 volumes of vehicle.

Robinski (SILVER STAINING METHOD). Allow 0.1- to 0.2-% solut. $AgNO_3$ to act for 30 seconds on objects to be stained.

Robiquet (MORPHINE). Ferric salts yield a blue color with morphine.

Roch (ALBUMINOIDS). Also known as *MacWilliam's* reagent. *Bourreau* modifies this by employing a solut. of oxyphenyl-sulphonic acid 3, and salicylic-sulphonic acid 1, in water 20.

Roch (ALBUMIN IN URINE). A ppt. is yielded with salicyl-sulphonic acid solut.

Rochleder (CAFFEINE). On heating with HCl and $KClO_3$ (or with freshly made chlorine water) and evaporating gently, caffeine develops a yellowish-red color, changing to violet on adding NH_3.

Rogers (TIN). Ammonium molybdate affords a blue color with stannous chloride, still visible in solut. of 1 : 250,000.

Rollett (FREEZING PROCESS). Small portions of tissue are placed on the stage of a freezing microtome after immersion in the white of a freshly laid egg, then frozen and cut with a well-cooled knife.

Roman-Delluc (UROBILIN IN URINE). Shake out 100 Cc. urine with 20 Cc. chloroform after acidulating with 8 to 10 drops acetic acid. Overlay 2 Cc. of clear chloroformic solut. with 4 Cc. of 1 : 1,000 solut. zinc acetate in 95-% alcohol. At line of separation a characteristic green fluorescence appears if urobilin present, more easily recognized against a black background. On shaking, fluorescence is more marked, and the mixture acquires a pink tint.

Romei (FUCHSINE IN FRUIT SYRUPS). Fruit syrup colored with fuchsine yields the dye to fusel oil when shaken with it.

Romei (WATER IN ETHER). Well-dried K_2CO_3 is insol. in pure ether, but forms a dense solut. with any water present.

Roosevelt (IRON PYROGALLIC STAIN). Mix 20 drops sat. solut. $FeSO_4$, 30 Gm. water, and 15 to 20 drops sat. solut. pyrogallic acid.

Rose (BIURET REACTION FOR ALBUMINS). The albumin solut. is rendered alkaline with NaOH and a dil. $CuSO_4$ solut. (17 or 18 Gm. in 1 litre water) added drop by drop with constant shaking. The solut. first becomes rose-red, then violet, and finally blue, the last appearing reddish when com-

pared with normal $CuSO_4$ solut. See also *Brueke's* biuret reaction and *Posner's* reaction.

Rosenbach (ALBUMIN). Add a few drops 5-% solut. chromic acid to a slightly acid urine—if albumin present, a yellowish flocculent ppt. forms. Phosphates pptd. on boiling are redissolved.

Rosenbach (BLOOD-CELL STAIN). Sat. aqueous solut. methylene blue 50 Cc.; sat. aqueous solut. phloxin, 20 Cc.; alcohol (95-%), 30 Cc.; water, 60 Cc. Stain is also good for all varieties of malarial parasites.

Rosenbach (BILIARY PIGMENTS). On carefully adding to urine a few drops 5-% chromic-acid solut. a green color is produced, which changes to brown on adding more reagent. In Rosenbach's modification of *Gmelin's* test, on filtering urine and letting a drop HNO_3 run down side of moist filter, a yellow to violet and green color results.

Rosenbach (GLUCOSE AND LACTOSE). On boiling a solut. (even 1 : 1,000) of glucose or lactose with a little sodium nitroprussiate and NaOH, a characteristic reddish-orange or red-brown color develops.

Rosenbach (INDIGO-RED IN URINE). Boil urine and add HNO_3 drop by drop—if indigo-red present a deep-red color develops, and the froth on shaking is violet. The color is soluble in chloroform or ether.

Rosenfeld-Silber (INDICATOR). The authors prepare a new indicator, "rubrescin," as follows: Fuse together 50 Gm. resorcin and 25 Gm. chloral hydrate in an oil-bath; at 160° C. the reaction proceeds without the necessity for further heating, HCl being eliminated. The melt forms a crumbly, non-hygroscopic mass insoluble in chloroform, slightly soluble in ether, soluble in warm amylic alcohol, and in cold methyl and ethyl alcohols, as well as in water. The 1-% solut. has a dark-red color, and its sensitiveness is very great. 1 drop of a deci-normal NaOH added to 100 Cc. water, and treated with 3 to 6 drops of the 1-% solut. retains its red color for an hour, and a red fluorescence is still visible even after standing one day. (When phenolphtalein is used under similar conditions, the color fades away in a few seconds.) A similarly excellent result is obtained with 1 to 2 drops of deci-

normal borax solut., and normal and acid sodium-carbonate solutions. With 1 drop of decinormal H_2SO_4 the color disappears completely when 3 drops of the indicator solution are used; when 5 to 6 drops are used the color is distinctly yellow. NH_3 too gives a red color. Rubrescin, as an indicator, must be regarded as of strongly acid character.

Rosenstiehl (ANILINE). See *Runge's* test.

Rosenstiehl (PARATOLUIDINE). Add HNO_3 to a solut. of paratoluidine in H_2SO_4—the latter becomes bluish-violet, then red and brown.

Rosin (BILIARY PIGMENTS). If biliary pigments present a green ring forms on overlaying a few Cc. of dil. iodine solut. on the urine.

Ross (PHOSPHORIC ACID). On dissolving a phosphate in a borax bead, and adding sodium tungstate, the bead becomes blue in the reducing flame.

Rossbach (POISONOUS ALKALOIDS). Action of alkaloids upon infusoria is tested, and the degree of toxicity estimated from intensity of action.

Rossel (BLOOD IN URINE). Acidulate urine strongly and shake with equal vol. ether. (If an emulsion forms, cool with ice-water, or add a few drops alcohol.) To ethereal solut. add a few drops water, then 15 to 30 drops old turpentine oil, or 5 to 10 drops H_2O_2, and shake lightly; then add 10 to 20 drops alcoholic 2-% solut. barbaloin and shake thoroughly—the aqueous layer acquires a distinct red color in 1 to 3 minutes if traces of blood present. (Coloration said to be discernible even when traces no longer detected spectroscopically.)

Roth (FIXED OILS). H_2SO_4 (sp. gr. 1.4), saturated with nitrous fumes is mixed with the olive or other oil to be tested, and the color and solidifying-point noted. See *Poutet's* elaidin test.

Rouget (METHYLENE-BLUE METHOD). Modify Dogiel's procedure by employing for muscles of Batrachia a 0.5-% solut. methylene blue in 0.6-% salt. solut.

Rouget (SILVER STAINING). Expose tissues repeatedly to the action of weak $AgNO_3$ solut. (1: 750 or 1,000), and wash with water after each bath. Reduce in glycerin.

Rousselet (PRESERVATION OF ROTIFERS). Place water containing the Rotifers in a watch-glass, and add at intervals a few drops of mixture containing 3 parts 2-% cocaine hydrochlorate solut., 1 part methylated spirit, and 6 parts water. When the cilia cease to beat, add a drop Flemming's liquid or of 0.25-% osmic acid-solut., and after that has acted for not more than half a minute, remove the Rotifers with a pipette, and wash them by passing 2 or 3 times through distilled water in watch-glasses. Finally, mount in a mixture of 2.5 parts formaldehyde and 37.5 parts dist. water.

Roussin (CRYSTALS). Ruby-colored crystals, reflecting dark blue, separate gradually from the oily mass obtained on mixing solutions of nicotine and iodine in ether.

Royere, De la (FIXED OILS). A red color develops on treating a few drops oil with 2 drops fuchsine solut. to which just enough alkali has been added to decolorize it. The color is produced by the free acids in the oils, and according to *Halphen* the value of the test is limited by the fact that mineral oils may also contain acids. The acids in oils used as lubricators may also be neutralized by alkaline soaps, though the presence of the latter can be easily detected by the red color formed on adding a solut. of congo red just colored violet by HCl.

Ruber (GLUCOSE IN URINE). See *Rubner's* test.

Rubner (GLUCOSE). A red ppt. forms on adding lead acetate and ammonia, then warming the solution.

Rubner (MILK-SUGAR). Boil with excess of lead acetate—a yellowish-brown color develops. On now adding NH_3 a brick-red color and cherry-red ppt. form.

Rudisch-Boroschek (URIC ACID IN URINE). The determination is made with a sat. aqueous solut. of sodium sulphite, each 100 Cc. of which contains in solution about 1 Gm. of silver chloride. On adding the solution to a solution of uric acid rendered strongly alkaline with sodium carbonate, there forms a flocculent precipitate, which soon settles, and which may be readily filtered off. The precipitate has most probably the composition $Ag\ C_5H_3N_4O_3$. On adding a sulphite-silver solution to urine rendered strongly alkaline with sodium carbonate, there forms a yellowish-white precipitate, which

also readily separates, and which may be filtered off and washed with sodium-carbonate solution.

Rudolf-Fischer (ACETANILID). Heat 5 Gm. acetanilid for some time with 5 Gm. dry $ZnCl_2$—a yellow coloring matter with moss-green fluorescence forms, which may be dissolved by heating with very dil. HCl. Product formed is flavanilin, $C_{16}H_{14}N_2$.

Ruempler (FREE ACIDS IN FIXED OILS). An emulsion forms on shaking the oil with a solut. chemically pure Na_2CO_3. NaOH must be absent.

Ruggieri-Tortelli (COTTONSEED OIL). See *Tortelli-Ruggieri.*

Runge (ANILINE). 1.—Aniline solut. in the absence of NH_4Cl yields with chlorinated-lime solut. a purple-red color, which changes to rose-red on adding acids. According to *Rosenstiehl*, in case the aniline is impure, ether is added after admixture of the chlorinated-lime solut.; this takes up the brown product formed, so that the aqueous solut. remains of a pure blue color. 2.—A pine shaving, moistened with a very dilute solut. of an aniline salt, is colored yellow.

Runge (CANE SUGAR). Sugar is blackened on concentrating it with dil. H_2SO_4. Many other organic substances act likewise, however.

Runge (CARBOLIC ACID). A pine shaving moistened with HCl is colored blue by carbolic acid.

Rupeau (PICRIC ACID IN BEER). Ferrous sulphate, 5 Gm.; tartaric acid, 5 Gm.; water, 200 Gm. Mix solution with an equal volume of sat. solut. NaCl. Overlay 1 to 2 Cc. reagent on half a Cc. beer and add 2 drops NH_3. Presence of picric acid is shown by a red color.

Rust (CARBOLIC ACID AND CREOSOTE). Collodion forms a jelly with carbolic acid, but not with creosote.

Ryder (DOUBLE IMBEDDING PROCESS). After the collodion bath, soak objects in chloroform, then remove into a mixture of chloroform and paraffin heated to not over 40° C., and finally into a bath of pure paraffin.

Sabanin-Laskowski (CITRIC ACID). Yellow color develops on heating with excess of NH_3 in a sealed tube at 120° C. for six hours. On pouring out and allowing to stand for several hours, color changes to blue.

Sabatier (COPPER). Add 1 drop solut. of a copper salt to 1 Cc. conc. HBr—if much copper present, a purple-red color at once develops; if little, color is lilac. A 0.0001-% solut. of a copper salt still gives the reaction. A mixture of KI and H_3PO_4 also gives the reaction, which develops on first carefully warming, then cooling.

Sabatier (NITRITES). On dissolving a few fragments cuprous oxide in conc. H_2SO_4 containing a little nitrite, the solut. is colored intensely violet to purple. All cuprous compounds, and cuproso-cupric derivatives afford the color. Cupric compounds do not react.

Sabatin (COPPER). Trace of a copper salt dissolved in conc. hydrobromic acid develops an intense purple color. 1 drop of a 1 : 30,000 copper-salt solut. added to 1 Cc. colorless conc. acid still affords the reaction. Reagent may be replaced by a solut. of KBr in orthophosphoric acid. Delicacy of reaction somewhat impaired by presence of free bromine; on driving off latter by heat, however, the color is observed.

Sabrazes-Deniges (TEST-PAPER FOR IODINE). Boil 1 Gm. starch with 40 Cc. water, cool, and add 0.5 Gm. sodium nitrite. Apply paste to both sides of heavy unsized paper. The dry paper is moistened with liquid to be tested, and moistened spot wetted with 1 drop 10-% H_2SO_4—if iodine (iodide) is present a blue color develops.

Sachs (NUTRIENT MEDIUM). Potassium nitrate, 1 Gm.; sodium chloride, 0.5 Gm.; calcium sulphate, 0.5 Gm.; magnesium sulphate, 0.5 Gm.; calcium phosphate, 0.5 Gm.; and a few drops of ferric-chloride solut. are dissolved in 1 liter of water.

Sachsse (GLUCOSE). Two solutions are made, composed respectively of mercuric iodide 18 Gm., potassium iodide 25 Gm., water 500 Cc.; and KOH 80 Gm. in 500 Cc. water. Before use for titration equal volumes of the two solutions are mixed; as an indicator, paper, saturated with an alkaline solut. stannous chloride is employed. A black spot is produced by a drop of the solution so long as any unreduced mercuric salt is present. Each 40 Cc. of this solution equals 0.1342 Gm. glucose.

Sacchse-Heinrich (GLUCOSE). Solut. contains only 10 Gm. KOH for the above quantities. The glucose solut. (about 5-%) is added to the boiling reagent until all mercury salt is reduced. As an indicator, H_2S is used, being added to a small portion of solut. acidulated with acetic acid. 40 Cc. reagent are reduced by 0.1342 Gm. glucose.

Sahli (METHYLENE-BLUE BORAX). 5-% solut. borax, 16 Gm.; sat. aqueous solut. methylene blue, 24 Gm.; dist. water, 40 Gm.

Sahli (STAINING NERVE-CENTERS). Sections of material hardened in bichromate are washed in water for 5 or 10 minutes and stained dark blue with conc. aqueous solut. methylene blue. They are then rinsed with water, stained for 5 minutes in sat. aqueous solut. acid-fuchsine, rinsed with alcohol, and passed into a large quantity water. Or, instead of rinsing in alcohol, use alcohol containing from 0.1 to 1% KOH, differentiate the stain in water, clear sections with cedar oil, and mount in balsam dissolved in cedar oil. For obtaining a specific stain of nerve-tubes, stain sections for a few minutes or hours in a mixture of 24 parts sat. aqueous solut. methylene blue, 16 parts 5-% solut. borax, and 40 parts water. Sections are then washed in water or alcohol until the gray matter can be clearly distinguished from the white, cleared with cedar oil, and mounted in balsam.

Salkowsky (CARBON MONOXIDE IN BLOOD). Mix suspected blood with 19 parts water and add an equal volume NaOH (sp. gr. 1.34)—if blood contains CO the mixture becomes immediately turbid, at first whitish, then bright red; after some time red flocks separate and float on surface of rose-colored liquid. Normal blood is colored a dirty-brown by NaOH.

Salkowsky (CHOLESTERIN). Dissolve a few Ctg. substance in 2 Cc. chloroform and shake solut. with 2 Cc. of conc. H_2SO_4. In presence of cholesterin the chloroform becomes blood-red and the acid exhibits greenish fluorescence. If test is applied as a zone reaction, a brownish-red zone appears. Breathing on chloroform solut. is said to change the red color to blue, green, and yellow.

Salkowsky (CREATININE). See *Weyl's* test.

Salkowsky (HEMATOPORPHYRIN). Ppt. urine with a solut. of Ba $(OH)_2$, wash ppt., extract with alcohol containing 1% HCl, and examine spectroscopically. Two characteristic bands are seen.

Salkowsky (INDOL). See *Bayer's* test.

Salkowsky (OXALIC ACID). Make 100 Cc. urine alkaline with $Ca(OH)_2$, add $CaCl_2$, evaporate partially, add alcohol, wash ppt. with some alcohol and hot water, then dissolve in HCl. Next add NH_3 and acetic acid. Octahedral crystals of calcium oxalate are thus obtained.

Salkowsky (PEPTONE IN URINE). Acidulate 50 Cc. urine with HCl, and ppt. with phosphotungstic or phosphomolybdic acid. Wash ppt., warm on water-bath, dissolve with a little NaOH, and add a few drops 1- to 2-% $CuSO_4$ solut. In presence of peptone, a red color appears. The author amends this test, since he finds that the presence of urobilin may occasion a ppt. and give the biuret reaction like albumose; if, therefore, urobilin present, it must first be removed from the phosphomolybdic ppt. before the biuret reaction is applied.

Salkowsky (PHENOL). Phenol solut. is colored blue or greenish by NH_3 and a few drops chlorinated-lime solut., and heating gently.

Salkowsky (POTASSIUM IN URINE). Evaporate 100 to 150 Cc. urine to 12 to 18 Cc., filter when cold, and add conc. solut. tartaric acid—potassium bitartrate deposits.

Salkowsky (SULPHUROUS ACID IN URINE). Add 10 Cc. HCl (sp. gr. 1.12) to 100 Cc. urine, and evaporate to 25 or 30 Cc. in a tube—a bluish or yellowish white ppt. forms on upper portion of cool tube.

Salkowsky-Kitasato (INDOL IN BACTERIAL CULTURE). See *Kitasato-Salkowsky.*

Salkowsky-Leubes (MUCIN IN URINE). Treat urine with 2 vol. absolute alcohol, collect ppt. and re-dissolve in water. The solut. gives a turbidity with acetic acid insoluble in excess, but soluble in HCl or HNO_3.

Salomon (XANTHIN; PARAXANTHIN; HETEROXANTHIN). NaOH or KOH ppts. paraxanthin and heteroxanthin, the former as right-angled prisms and planes, the latter as acute or obtuse-angled, often double, crystals.

Salzer (ALCOHOL IN ESSENTIAL OILS). The same as *Puscher's.*

Sandlund (IODINE IN URINE). Treat 5 Cc. urine with 1 Cc. H_2SO_4 (1 : 5) and 2 or 3 drops sodium-nitrate solut. (1 Gm. in 500 Cc.), then shake up with carbon disulphide—this becomes colored if iodine present (up to 0.001%).

Sankey (STAINING NERVE-CENTERS). Stain in a 0.5-% solut. aniline blue-black, and in order to obtain a differential stain, wash out for 20 to 30 minutes in chloral-hydrate solut.

Sargent (BLEACHING METHOD). Soak insects to be bleached for a day or two in a mixture of HCl 10 drops, potassium chlorate 30 grains, water 1 fl. ounce. Wash well.

Sattler (SILVER STAINING). Preparations stained with $AgNO_3$ are exposed to light for a few minutes in water acidulated with acetic or formic acid.

Saul (ESERINE). If a solut. of eserine, or one of its salts, be heated to boiling, and a few drops of strong HNO_3 added, an orange-colored liquid is obtained, which, on adding NaOH in excess, yields an intensely violet solut. The violet color is changed to pale-orange by acids, and restored by alkalies.

Saul (TANNIN). To about 0.015 Gm. tannin in 3 Cc. water add 3 drops of 20-% alcoholic solut. thymol, and then 3 Cc. strong H_2SO_4—gallotannic acid yields a turbid rose-colored solut.; gallic acid remains practically uncolored.

Savalle (FUSEL OIL IN ALCOHOL). Heat alcohol with an equal vol. conc. H_2SO_4 until boiling commences—fusel oil is indicated by the formation of a brown color; all aldehydes and even higher alcohols give this reaction. If the latter are to be tested for, the aldehydes may be removed by heating for half an hour with a little metaphenylenediamine hydrochlorate and subsequent distillation; the distillate thus freed from aldehydes is tested with H_2SO_4. If the quantity of fusel oil is slight, 10 to 20 drops of a 1 : 1,000 solut. furfurol may be added, and then a pink color is developed, if higher alcohols present, on heating with H_2SO_4. Test may be employed quantitatively for the colorimetric determination of fusel oil.

Schaal (INDICATOR). Alizarine is colored yellow by acids, and rose-red by alkalies.

Schacht (BENZOIC ACID). The acid from Siam benzoin decolorizes an alkaline solut. $KMnO_4$, but that from other sources merely alters the color to green.

Schack (PEPPERMINT OIL). A blue-green color is given with fused salicylic acid; on dissolving mixture in alcohol the solut. is blue by transmitted, and red by reflected, light.

Schaefer (CINCHONIDINE IN QUININE SULPHATE). Dissolve 1 Gm. quinine sulphate in 9 Gm. absolute alcohol and 3 Gm. 5-% H_2SO_4. After standing for a day with occasional shaking, any cinchonidine present will have pptd. as tetrasulphate, that salt being only slightly soluble in alcohol. By dissolving in water and pptng. again with NaOH, the cinchonidine can be obtained pure (m.p. 199° C.).

Schaefer (MARTIUS' YELLOW IN PASTRY). Heat 200 Gm. pastry with 50- to 60-% alcohol, concentrate by evaporation, and add HCl—if Martius' yellow present, a whitish, flocculent ppt. of dinitro-alphanaphtol forms, soluble in ether with yellow color. If naphtol-yellow (a sulpho-derivative of Martius' yellow) present HCl gives no ppt., but NaOH does.

Schaefer (NAPHTOL-YELLOW IN PASTRY). 10 to 20 Gm. material to be tested are broken up into crumbs and warmed with 40 Cc. alcohol (50 to 60% by vol.)—naphtol-yellow colors the alcohol yellow; on adding HCl this color disappears, while that produced by saffron would remain; metanil-yellow is colored red.

Schaefer (NITRITES IN URINE). Decolorize 3 or 4 Cc. urine with animal charcoal, then treat with an equal volume acetic acid (1 : 10), and 2 drops 5-% potassium ferrocyanide solut.—nitrites cause a yellow color.

Schaefer (QUININE SULPHATE). Oxalate test. Dissolve 1 Gm. crystallized (or 0.85 Gm. anhydrous) quinine sulphate in 35 Cc. boiling water, add a solut. of 0.3 Gm. crystallized neutral potassium oxalate in 5 Cc. water, and distilled water to make up 41.3 Gm. Place the vessel in a water-bath heated to 20° C. for half an hour, shaking occasionally, and filter through glass wool. On adding a drop NaOH solut. to 10 Cc. filtrate no turbidity is produced if the quinine sulphate is free from allied alkaloids.

Schaeffer (DIFFERENTIATING BOILED FROM UNBOILED MILK). Add 1 drop 0.2-% H_2O_2 and 2 drops 2-% solut. paraphenylenediamine to 10 Cc. milk, and shake—unboiled milk is immediately colored blue.

Schaellibaum (SERIAL SECTIONS). Attach sections to slides by the aid of a mixture of 1 part collodion and 3 or 4 parts clove or lavender oil; spread thinly with a small brush. After arranging the sections, heat gently until the oil has evaporated.

Schaer (BLOOD). See *Huehnefeld's* turpentine solution.

Schaer-van Ankum (CHLORAL ALCOHOLATE IN CHLORAL HYDRATE). Treat 1 Gm. chloral hydrate with 1 Cc. HNO_3 (sp. gr. 1.38)—no yellow color or vapors should result at ordinary temperature or on heating, in the course of 10 minutes.

Schaerge (COCAINE). Dissolve 0.02 Gm. substance in 1 drop water, and add 1 Cc. conc. H_2SO_4. To this add 1 drop potassium chromate or bichromate solut.—a rapidly disappearing ppt. forms; on heating, the yellowish-red solut. becomes green.

Schaffgot (MAGNESIA). By using a solut. of 235 Gm. ammonium carbonate and 180 Cc. NH_3 (sp. gr. 0.92) in 1 liter, magnesia can be pptd. without addition of fixed alkalies.

Scheele (ARSENOUS ACID). A solut. copper sulphate in excess of NH_3 affords a light-green ppt. with an arsenite.

Scheibler (ALKALOIDS). Phosphotungstic acid or its sodium salt affords ppts. similar to those thrown down by phosphomolybdic acid. Prepare reagent by adding 100 Gm. sodium tungstate to 60 to 80 Gm. sodium phosphate in 500 Cc. water acidulated with HNO_3. *Otto* simply adds phosphoric acid to a solut. sodium tungstate. See *Sonnenschein's*, *Jungman's*, and *De Vrij's* tests.

Schell (COCAINE). Mix cocaine hydrochlorate with calomel, and moisten or breathe on mixture—latter is blackened by partial reduction of calomel. See *Lenz's* reaction for pilocarpine.

Schenk (CARBOLIC FUCHSINE). Stain is prepared by dissolving 1 Gm. fuchsine and 5 Gm. crystallized carbolic acid in 10 Gm. alcohol and 100 Gm. dist. water. Or, a 5-% aqueous solut. of carbolic acid may be saturated with conc. alcoholic solut. fuchsine, saturation being indicated by formation of a metallic-looking pellicle on surface of the liquid. The stain is washed out with alcohol followed by clove oil.

Schenk (FIXING FLUID). Solut. uranium acetate is used, its properties resembling those of picric acid. It has a mild fix-

ing action and a high degree of penetration, and may be combined with methyl green.

Scherer (HYDROGEN PHOSPHIDE). Test for PH_3 in excreta in phosphorus poisoning depends upon *Hager's* test (q. v.), by means of silver-nitrate paper.

Scherer (INOSITE). Evaporate aqueous solut. almost to dryness with HNO_3, and treat residue with NH_3 and a trace of $CaCl_2$. On further concentration a rose-red solut. results.

Scherer (LEUCINE). Carefully evaporate leucine with HNO_3 to dryness on platinum foil, and warm residue with NaOH—a yellow liquid remains, which on further heating contracts to an oily, non-adhering drop.

Scherer (PHOSPHORUS). A black stain forms on heating the substance to 30 to 40° C., and exposing a slip of silver-nitrate test-paper to the vapors given off. See *Hager's* test for phosphorus.

Scherer (TYROSIN). 1.—On evaporating substance carefully with HNO_3 there form oxalic acid and nitrotyrosin; latter is colored deep red-brown by KOH and NH_3. 2.—On heating tyrosin on platinum foil with HNO_3 (sp. gr. 1.2), tyrosin dissolves with bright orange-yellow color, and on evaporating leaves a shining, transparent, deep-yellow residue, soluble in NaOH with reddish-yellow color. This solut. on evaporation leaves a deep blackish-brown residue.

Schering (ALKALOIDS). Phospho-tungstic acid is used as a precipitant. See *Scheibler's* test.

Schering (IODATES IN IODIDES). A yellow zone forms on adding to the solut. a crystal of tartaric acid.

Schering (UROTROPIN IN URINE). Urotropin affords a characteristic reaction with a saturated bromine solution (bromine 10 parts and distilled water 90 parts). Several drops of this solution added to a non-albuminous urine containing urotropin, develops an orange-yellow ppt. which is dissipated on lightly striking the test-tube, and reforms with an excess of reagent. The test must be carried out in the cold; when warm, the precipitate is not produced with an excess of bromine water. The urine may be filtered through animal charcoal before testing for urotropin. Albuminous urine gives with bromine water a precipitate which becomes yellowish

with a large excess of reagent; this precipitate might be confounded with that caused by urotropin, with which it presents certain analogy. It is hence important to first remove the albumin before making the test. Furthermore, a precipitate caused by urotropin is soluble on heating; that caused by albumin coagulates.

Schermer (SANTONIN). Slowly heat together a few granules santonin and a few Mg. powd. potass. cyanide, in a porcelain capsule—when mass melts, a red color develops which rapidly changes to brownish-yellow. With water the fused mass gives a fluorescent solut., brown by transmitted and green by reflected light.

Schiefferdecker (DIGESTION FLUID). Macerate pieces of tissue epidermis for 3 or 4 hours at about 37° C. in a sat. aqueous solut. of pancreatin.

Schiefferdecker (METHYL MIXTURE). Methyl alcohol, 5 Cc.; glycerin, 50 Cc.; distilled water, 100 Cc. Mixture is used as a dissociating fluid for retina and central nervous system. Several days are required for complete dissociation.

Schiff (ALDEHYDES). Reagent employed is fuchsine-sulphurous acid. See *Guyon's* test.

Schiff (CHOLESTERIN). 1.—A red color appears on treating cholesterin with conc. H_2SO_4, or evaporating with HNO_3 and then adding NH_3. 2.—A violet color develops on adding a mixture of 2 vol. H_2SO_4 or HCl and 1 vol. of dil. Fe_2Cl_6 solut. and heating. On evaporating, a violet residue is left.

Schiff (GLUCOSE AND CARBOHYDRATES). Saturate papers with a mixture of equal volumes acetic acid and xylidin with a very little alcohol. Heat substance to be tested with H_2SO_4—if glucose present furfurol forms, the vapors of which color the test-paper red.

Schiff (SULPHUROUS ACID). A gray stain appears on exposing mercurous-nitrate test-paper to vapor of H_2SO_3.

Schiff (TEST-PAPER FOR PHOSPHORUS, ARSENIC, CHROMATES, AND URIC ACID). Paper impregnated with silver-nitrate gives a black color with phosphorus, a red with chromates, a yellow with arsenic, and a brown with uric acid.

Schiff (UREA). Treat a solut. of urea (urine) with furfurol and HCl—a violet color develops, and later an insoluble brown mass deposits.

Schiff (URIC ACID). An alkaline uric-acid solut. reduces $AgNO_3$ or Ag_2CO_3. Moisten filter-paper with $AgNO_3$ solut., touch moistened spot first with a little dil. $NaCO_3$ solut., and then with the solut. to be tested—a yellow spot appears if uric acid present.

Schimmel (CORIANDER OIL). This oil must afford a clear solut. with 3 parts 70-% alcohol (by volume); oil cedar, turpentine, etc., are insoluble in alcohol of this strength.

Schimmel (LEMON OIL). 1 part oil must give with 10 parts 80-% alcohol (by volume) a clear or at most slightly opalescent solut. which should not deposit even on long standing. If fatty oils present, mixture will be cloudy, and oil drops will deposit in about 12 hours; if petroleum or kerosene present, these will settle to the bottom.

Schimmel (MENTHOL IN PEPPERMINT OIL). Heat about 20 Gm. oil and 30 Cc. normal alcoholic NaOH solut. in a flask with reflux condenser for 1 hour, then titrate uncombined alkali with normal H_2SO_4, using phenolphtalein as an indicator. Each Cc. of alkali used equals 0.156 Gm. menthol (which exists as ester, *i. e.*, combined menthol). The saponified oil is then washed with water till free from alkali, and next boiled for 1 hour with an equal vol. acetic anhydride, and 2 Gm. anhydrous sodium acetate. The product is washed first with water, then with very dilute NaOH solut., dried with anhydrous sodium sulphate, and filtered. From 8 to 10 Gm. of this acetylized oil then saponified with 50 Cc. alcoholic NaOH as before, and the uncombined alkali titrated with normal H_2SO_4. Then, if S = weight of acetylized oil, A = the number of Cc. NaOH solut. used, P = % of total menthol,

$$P = \frac{A \times 15.6}{S - (A \times 0.042)}.$$

Schindelmeiser (NICOTINE). Add a few drops 30-% formaldehyde free from formic acid to non-resinified nicotine, then add 1 drop conc. HNO_3—solut. acquires an intense, pink color.

If much nicotine present, solut. is dark-red; if nicotine resinified, color is blood-red.

Schlagdenhauffen (ALKALOIDS). A black color forms on treating alkaloids with an aqueous solut. pyrogallic acid to which an alcoholic solut. of $HgCl_2$ has been added.

Schlagdenhauffen (DISTINGUISHING ALKALOIDS FROM GLUCOSIDES). Equal parts of 3-% guaiac-resin solut. and a sat. solut. $HgCl_2$. Only alkaloids give a ppt. with this reagent in the cold, or, at from 60° to 79° C., a blue color.

Schlagdenhauffen (MAGNESIUM SALTS). A brownish-red color or ppt. forms on adding a golden-yellow solut. of iodine in 2-% NaOH or KOH.

Schlickum (ARSENIC). Overlay suspected solut. upon a solut. 0.02 Gm. sodium sulphite and 0.4 Gm. stannous chloride in 3 to 4 Gm. of conc. HCl—a yellow zone forms if arsenic present.

Schlickum (INDICATOR). Cochineal tincture is recommended as an indicator in titrating phosphoric acid.

Schlienkamp (NUX VOMICA). A crimson color, disappearing on cooling, develops on adding a little H_2SO_4 and evaporating.

Schlossberger (TEXTILE FIBERS). Conc. ammoniacal solut. of freshly pptd. and still moist nickelous-hydroxide. The solut. dissolves silk, but neither wool nor cotton. Compare with *Persoz's* test.

Schmans (STAINING NERVOUS TISSUE). Use English blue-black in 0.25-% solut. in 50-% alcohol, with addition of a little picric acid. Stain sections for an hour.

Schmatolla (TIN). Dip a glass or porcelain rod into a solut. of tin in conc. HCl, and introduce into a colorless Bunsen flame—an intense bluish-white flame denotes presence of tin. Sb does not interfere with reaction. As, if present in more than equal quantity, prevents the color and leaves the rod coated with a dark layer of As and Sn.

Schmid (METALLIC SALTS). A solut. of phosphorus in carbon disulphide throws down colored ppts. when shaken with aqueous solut. of the salts.

Schmidt (GLUCOSE). Ammoniacal lead-acetate solut. causes a brownish-red ppt. upon warming with diabetic urine or other glucose solutions. Cane sugar does not cause the reduction. See *Rubner's* test.

Schmidt (NITRIC ACID). Mix solut. to be tested with an equal vol. of solut. of 20 drops aniline, 10 Gm. dil. H_2SO_4, and 90 Gm. water, and overlay this mixture upon conc. H_2SO_4—if HNO_3 present, a light- to dark-red zone forms.

Schmidt (SACCHARIN). Shake out strongly acidulated liquid three times with a mixture of equal vol. ether and petroleum ether, treat extracts with NaOH, evaporate to dryness, and heat residue for half an hour to 250° C. Then dissolve mass in water, acidulate with H_2SO_4 and shake out with ether. If saccharin present it is found in the ethereal extract as salicylic acid, which, after evaporation of the ether, can be identified by means of Fe_2Cl_6.

Schmidt-Donath (RESIN IN WAX). See *Donath-Schmidt.*

Schmiedeberg (GLUCOSE). $CuSO_4$, 34.634 Gm.; water, 200 Cc. mannite, 15 Gm.; water, 100 Cc. NaOH solut. (sp. gr. 1.145), 400 Gm. Mix solutions, and add water to make 1,000 Gm. Used like *Fehling's* solut.

Schneider (ACETO-CARMINE). Add carmine to boiling 45-% acetic acid until saturated, and filter. A drop of the conc. solut. may be added to a fresh preparation under the cover-glass, but for slow staining dilute to 1-% strength.

Schneider (ALKALOIDS). Mix a few Mg. of substance with 6 to 8 parts sugar on a porcelain plate and add 1 drop of conc. H_2SO_4—*morphine* or *codeine* causes a fine purple-red to violet-green color, which gradually changes to dingy yellow. Addition of water causes rapid decoloration. *Aconitine* is the only other alkaloid that may be mistaken for morphine or codeine by this test. Reaction depends on formation of furfurol, and may hence be obtained by use of furfurol and H_2SO_4.

Schneider (ARSENIC). Separate arsenic as arsenous chloride, by distillation with HCl and Fe_2Cl_6, then identify by *Marsh's* test.

Schneider (BENZOIC ACID). Same as *Schacht's* test.

Schneider (BISMUTH). 3 parts tartaric acid and 1 part stannous chloride dissolved in sufficient KOH solut. gives a black ppt. upon warming with a bismuth salt.

Schneider (CODEINE). Dissolve codeine in conc. H_2SO_4, warm lightly, and add 2 or 3 drops conc. solut. cane sugar—a purple-red color develops.

Schneider (FOREIGN [CRUCIFEROUS] OILS IN OLIVE OIL). Dissolve oil in 2 parts of ether, add 5 Cc. sat. alcoholic solut. $AgNO_3$, set mixture aside for 12 hours in a dark place—if oils containing sulphur are present, the mixture darkens.

Schneider (POTASSIUM CYANATE IN POTASSIUM CYANIDE). Test depends upon the formation of the ultramarine-blue coblat cyanate. From the potassium-cyanide solut., as conc. as possible, the HCN is removed by means of CO_2, the K_2CO_3 pptd. by the addition of alcohol, and the filtrate then tested with cobalt-acetate solut.

Schoenbein (BLOOD). Tincture of guaiac resin and oil turpentine. See *Almén's* test.

Schoenbein (COPPER). A solut. of a copper salt yields a blue color on adding potassium cyanide and tincture of guaiac.

Schoenbein (HYDROCYANIC ACID). 1.—Filter-paper dipped in 10-% tincture guaiac and dried, then moistened with 0.1-% $CuSO_4$ solut., turns blue in the presence of HCN. See *Payer's* test. 2.—Mix suspected liquid with 5 parts fresh, defibrinated blood and 45 parts water, then add a little H_2O_2. In the presence of HCN the red color is changed to brown.

Schoenbein (HYDROGEN DIOXIDE). 1.—A blue color appears on adding a little cadmium-iodide starch paste and a little ferrous sulphate. See *Boettger's* test. 2.—Freshly prepared tincture of guaiac and a few drops cold prepared infusion of malt give a blue color. 3.—A mixture of Fe_2Cl_6 and potassium ferricyanide solut. also produces a blue color.

Schoenbein (NITROUS ACID). 1.—On adding to potable water containing nitrous acid, a solut. of pyrogallic acid and a little dil. H_2SO_4, a brown color forms. 2.—Add to water sufficient indigo solut. to color it deep blue and a little HCl, then while stirring add sufficient potassium pentasulphide to cause the blue color to disappear, and filter. On adding the suspected water or solut. of nitrite, the blue color reappears.

Schoenbein (NITRIC AND NITROUS ACIDS IN URINE). 1.—Potassium-iodide starch paste faintly acidulated with H_2SO_4 is colored deep blue by slightest trace of nitrous acid. 2.—An acidulated solut. containing pyrogallic acid is colored deep blue by nitrous acid, with evolution of nitrogen oxide gas. If test is carried out in a flask, the gas is converted into hypo-

nitrous acid on contact with air, and would color potassium-iodide starch paper blue, or would decolorize indigo paper.

Schoenbein (OZONE TEST-PAPER). Filter-paper saturated with potassium-iodide starch paste (10 parts starch, 200 parts water, and 1 part potassium iodide). Ozone turns this paper blue.

Schoenbein-Pagenstecher (HYDROCYANIC ACID). See *Schoenbein's* test.

Schoenn (COBALT). Neutral sodium-sulphocyanide solut. gives a blue color.

Schoenn (HYDROGEN DIOXIDE). A yellow to deep-red color develops on adding titanic acid solut.

Schoenn (MOLYBDIC ACID). A blue color develops on heating with H_2SO_4 and cooling.

Schoenn (PHOSPHORUS). PH_3 is evolved on heating the dry substance with magnesium and adding water.

Schoenn (SULPHUR). A red color appears on heating with sodium, dissolving in water and adding solut. sodium nitroprusside.

Schoenvogel (DIFFERENTIATING ANIMAL FROM VEGETABLE OILS). Upon shaking with 6 Cc. conc. solut. borax the vegetable oils, olive oil excepted, are said to form emulsions, while the former separate out sharply upon standing.

Schoenvogel (FOREIGN FATS IN BUTTER). Shake together 6 Cc. of a sat. borax solut. and 5 drops butter at room temperature, or warm to melting-point of the fat. Butter, beef tallow, olive oil, and mutton tallow are said not to emulsify when so treated; all other fats do.

Schonteten (ALOES). A conc. solut. borax gives a distinct green fluorescence with extract aloes, barbaloin, capaloin, and socaloin, but not with nataloin.

Schott (WHITE-LEAD PAPER [POLKA-PAPER]). A sized paper coated with white lead, used as an indicator in titrating solutions of metallic salts with sodium sulphide.

Schotten-Baumann (ALCOHOLS AND AMINES). Reagent is benzoyl chloride. See *Baumann's* test.

Schramm (OILS). When fixed oils are mixed with essential oils, a characteristic odor is given off on burning with a wick and blowing out the flame.

Schreiber (SUGAR IN URINE). Cupric sulphate, 2; sodium salicylate, 2; sodium carbonate, 2; dist. water, 88. On boiling 5 Cc. reagent in test-tube the ppt. formed is gray to black on boiling with equal quantity saccharine urine, ppt. is dirty green with yellowish deposit on sides of tube. If more urine added, reduction is completed, and the whole precipitate is yellow.

Schreiner-Kremers (SPEARMINT OIL). Treat oil with hydroxylamine, drive off volatile matter with steam, and dry and weigh resulting carvoxime. Reaction is as follows: $C_{10}H_{14}O + H_2NOH = C_{10}H_{14} \cdot N \cdot OH + H_2O$. See also *Kremers-Schreiner*.

Schreiter (GLUCOSE). A red ppt. is thrown down on adding a mixture of 2 parts sodium salicylate, 2 copper sulphate, 1c soda (? caustic), and 40 water.

Schroeder (ACETANILID IN THE PHENACETIN). Boil 0.5 Gm. phenacetin with 6 to 8 Cc. water, cool, filter off the crystallized phenacetin, boil filtrate after adding KNO_3 and dil. HNO_3, add a few drops *Plugge's* reagent, and boil again. If acetanilid present, a red color appears.

Schuchardt (HYDROCHLORIC ACID IN THE GASTRIC JUICE). Reagent is a conc. alcoholic solut. tropæolin. See also *Van der Velden's* test.

Schuetzenberger (ANTHRAQUINONE). A red color develops on adding an alkaline solut. of sodium thiosulphate.

Schulten-Wetzlar (URIC ACID). NH_3 ppts. uric acid so completely from urine that addition of an acid gives no further ppt.

Schultze (ALKALOIDAL REAGENT). Phosphoantimonic acid. Prepared by dropping antimonic chloride into aqueous phosphoric acid, or by mixing 4 parts of a sat. sodium-phosphate solut. with 1 part of antimonic chloride. With alkaloids, this reagent, like phosphomolybdic and phosphotungstic acids, yields white ppts. generally. See *Jungmann's*, *Scheibler's*, *Sonnenschein's*, and *De Vrij's* tests.

Schultze (ALBUMIN). Upon adding a trace of sugar to a solut. albumin in moderately conc. H_2SO_4 and warming to 60° C., a beautiful bluish-red color appears (furfurol reaction). See *Raspail's* reaction.

Schultze (AMMONIA). Chlorinated-lime solut. and carbolic acid produce a green color.

Schultze (CELLULOSE). 1.—Dissolve 25 parts anhydrous zinc chloride and 8 parts KI in 8.5 parts water, then add as much iodine as will dissolve on slightly warming. 2.—*Squire's* formula: Evaporate 100 Cc. solut. zinc chloride B.P., to 70 Cc., and dissolve in it 10 Gm. KI; then add 0.2 Gm. iodine and shake at intervals till saturated. 3.—Dissolve zinc in pure HCl, evaporate in presence of metallic zinc to syrupy consistency, then saturate with KI and I. Pure cellulose is colored blue with this reagent.

Schultze (IODIZED SERUM). To the fresh amniotic liquid of mammals add iodine and agitate frequently during some days. Or, mix serum with a large proportion tincture iodine and filter. Add a little of this every 2 or 3 days to the serum intended for use.

Schultze (MACERATING MIXTURE). Place sections in HNO_3 (sp. gr. 1.2) and add 2 to 3% potassium chlorate. Leave for several hours in the cold; solution of the middle lamella may also be attained in a few seconds by warming gently until gas is given off freely. Afterwards wash tissue in water, transfer to a slide, and complete disintegration with needles.

Schultze (MOUNTING MEDIUM). A nearly sat. aqueous solut. potassium acetate.

Schultze (STAINING BACILLI). Stain sections and cover-glass preparations for some hours in aqueous methylene-blue solut., differentiate in 0.5-% acetic acid, dehydrate in alcohol, clear in cedar oil, and mount in balsam.

Schultzen (STRYCHNINE IN URINE). Evaporate alcoholic extract of concentrated urine, make residue alkaline with KOH, and exhaust with ether. Evaporate ether, and test crystals remaining by usual tests for strychnine.

Schulze (GUANIDINE SALTS). Nessler's reagent (q. v.) gives a pale-yellow ppt., at first flocculent, but becoming dense later.

Schulze (NITRIC ACID IN URINE). Fe_2Cl_6 and HCl develop nitrous oxide in urine containing nitric acid.

Schulze (SALICYLIC ACID). A neutral solut. of a salicylate yields a green color with $CuSO_4$ solut.

Schumpelitz (VERATRINE). Upon evaporating a few drops solut. fused zinc chloride in dil. HCl to dryness with veratrine, a red color results.

Schunke-Mulder (ALOES). Concentrate mixture of 1 part substance and 8 to 10 parts conc. HNO_3 with gentle heat, and collect yellow ppt. (of aloetic and chrysammic acids). Extract aloetic acid with strong boiling alcohol. It is insol. in cold alcohol, is orange colored and crystalline, and dissolves in KOH with red color; in NH_3 with violet. Chrysammic acid is yellow, amorphous or crystalline, gives off yellow vapors on being rapidly heated, and dissolves in boiling water with purple-red color; in KOH it dissolves with decomposition, giving a black-brown solut. Its alkali salts have a gold-green, metallic color; its barium salt is red.

Schuster (COLORING-MATTER IN BEER). Pure beer is said to be decolorized by tannin solut., while beer colored with caramel is not decolorized.

Schuttleworth (GOLD IN SILVER NITRATE). Ppt. $AgNO_3$ with HCl, and add potassium rhodanide to filtrate—if gold present, an orange-red color develops.

Schütz (ALKALINE METHYLENE BLUE). Equal parts conc. alcoholic solut. methylene blue and 0.01-% solut. KOH.

Schütz (BACTERIA STAIN). Stain in mixture of equal parts 1:10,000 KOH solut. and conc. alcoholic solut. methylene blue for 24 hours. Rinse in water containing 4 drops acetic acid, then place in 50-% alcohol for 5 min., then in absol. alcohol 15 min., then in cedar oil, and finally mount in Canada balsam.

Schütz (GONOCOCCUS STAIN). Stain 5 to 10 minutes in a cold, sat. solut. methylene blue in 5-% filtered carbolic water; wash with water, dip in acetic-acid water (5 drops dil. acetic acid in 20 Cc. dist. water). Double stain with very dilute solut. safranin. Gonococci stain blue; pus-cells and their nuclei stain salmon-colored.

Schuyten (NITROUS ACID). Antipyrine, 1; acetic acid, 10. Dilute 10 Cc. of the solut. with 90 Cc. water, and to 5 Cc. of the solut. so obtained add 5 Cc. solut. to be tested—if nitrous acid present a green color develops. Also known as *Curtmann's* reagent.

Schwabe (QUININE). Potassium-cyanide solut. produces a crimson color.

Schwanda (BILIARY PIGMENTS). Evaporate urine to dryness on water-bath, exhaust residue with water, filter extract,

wash and dry filter-paper, and exhaust latter repeatedly with warm chloroform. Then test chloroformic golden-yellow solut. for bilirubin with HNO_3 or bromine water.

Schwartz (SUGAR IN URINE). Heat to boiling 10 Cc. urine and add 5 Cc. 10-% neutral lead-acetate solut.; again boil and filter while hot. Solut. NaOH is then added in sufficient excess to dissolve the ppt. first formed, followed by a few grains of phenylhydrazine. The liquid is boiled for some minutes, strongly acidulated with acetic acid, and allowed to cool. If much sugar present an immediate ppt. is formed; if only traces, a turbidity appears on standing.

Schwarz (SULFONAL). The odor of mercaptan is developed upon heating with charcoal.

Schwarzenbach-Delf (REAGENT). Potassium platinic chloride.

Schwarzenbach-Delf (ALKALOIDS). Characteristic color reactions result on treating alkaloids with HNO_3 and subsequently with NH_3.

Schwarzenberg (ALKALOIDS). See *Schwarzenbach-Delf*.

Schwanert (URIC ACID). NH_3 ppts. a further quantity of uric acid in urine from which uric acid has been previously pptd. by HCl.

Schweiger-Seidel (ACID CARMINE SOLUTION). Saturate ammoniacal carmine solut. with acetic acid and filter. Stain particularly adapted for coloring cell nuclei; after staining, macerate sections in glycerin containing 0.5% HCl, then wash with acetic acid, and finally in water. Mount preparations in glycerin. Only cell-nuclei are stained.

Schweissinger (ALKALIES). A solut. of equal parts of iodine and tannin in absolute alcohol produces a red color, even in very dilute aqueous solut. of alkalies or alkaline carbonates.

Schweitzer (SOAP IN LUBRICATING OILS). In presence of soap, the ethereal solut. of the oil yields a white ppt. when treated with sat. solut. metaphosphoric acid in absolute alcohol.

Schweitzer (TEXTILE FIBERS AND CELLULOSE). 1.—Freshly pptd., washed, and still moist cupric hydroxide or carbonate is shaken with 20-% NH_3 until a saturated solut. results. 2.—Dissolve 10 parts $CuSO_4$ in 100 water, and add a solut. of 5 parts of KOH in 50 water; then wash the ppt. and dissolve in 20-% NH_3 until saturated. This solut. dissolves

cotton, linen, and silk, but not wool. Reagent is especially useful in microscopy, as it rapidly dissolves cellulose, but has no action on lignin. According to *Boettger*, reagent can be prepared by allowing stronger NH_3 to repeatedly run in a thin stream over copper foil. *Wiesner* prepares it by keeping copper turnings in contact with a 13- to 16-% NH_3 in an open bottle.

Schwicker (ACETONE IN URINE). The first fraction of distillate from sample is mixed with a few drops conc. NH_3, and a few drops decinormal iodine solution are added. A black ppt. of nitrogen iodide at first appears, but disappears on warming, and if acetone present, iodoform is formed.

Scivoletto (HYDRIODIC ACID IN URINE). Dip filter-paper into starch paste, dry, sprinkle with urine, and hang in upper part of a flask containing fuming HNO_3—a blue color develops on paper.

Sclavo (STAINING FLAGELLA). Leave preparations for 1 minute in a solut. 1 Gm. tannin in 100 Cc. 50-% alcohol; wash in distilled water; transfer for 1 minute to 50-% phosphomolybdic acid; again wash, and stain for 3 to 5 minutes in a hot sat. solut. fuchsine in aniline water. Then wash in water, dry on filter-paper, and mount in balsam.

Scudder-Mulliken (METHYL ALCOHOL). See *Mulliken-Scudder.*

Seaman (GLYCERIN JELLY). Dissolve isinglass in water so as to make a jelly that remains stiff at the ordinary temperature of the room, and add one-tenth part glycerin, together with a little solut. borax, carbolic acid, or camphor water. Filter through muslin whilst warm, and add a little alcohol.

Sedgwick (ALKALOIDS). Best isolated as iodosulphates.

Seegen (SUGAR IN URINE). Filter urine several times through animal charcoal (to remove coloring matter, uric acid, etc.), then apply *Fehling's* solut. See also *Trommer's* test.

Seidel (INOSITE). Evaporate the solut. to dryness with HNO_3 and treat residue with strontium-acetate solut. A violet color develops with inosite.

Seiler (ALCOHOL BALSAM). Heat Canada balsam until it becomes brittle when cold, then dissolve in warm absolute alcohol and filter through absorbent cotton. This is chiefly useful as a mounting medium for objects stained with carmine.

Seiler (CLEANING GLASS SLIDES). New slides or covers for microscopic objects are placed for a few hours in a mixture of 3 oz. potassium bichromate, 3 fl. oz. H_2SO_4, and 25 fl. oz. water. Subsequently wash with water and wipe dry with a linen rag, after draining off excess of moisture. Covers that have been used should be previously immersed for a few days in a mixture of equal parts alcohol and HCl. Old slides must be scraped free of the mounting medium before immersing in bichromate solution.

Seiler (DOUBLE STAIN). Stain objects with borax-carmine, wash out in acidulated alcohol, then in alcohol only, and after-stain with extremely dilute solut. indigo-carmine, prepared by adding 2 drops sat. aqueous solut. of stain to 1 fl. oz. alcohol, and filtering.

Seivolete (IODINE IN URINE). Moisten strips of paper saturated with starch paste, and expose to vapors of fuming HNO_3 —if iodine present in urine, paper becomes blue. 0.00001 Gm. KI may be detected by evaporating urine from paper until the latter only damp and exposing to 1 or 2 drops acid.

Selden (SOLVENT FOR URINARY SEDIMENT). Reagent for dissolving urinary sediment in examining for tubercle bacilli is a solut. of 4 parts borax and 4 parts boric acid in 100 parts water. See *Daiber's "Mikroskopie des Harns,"* p. 40.

Seligsohn-Bill (CINCHONINE). See *Bill-Seligsohn.*

Seliwanoff (FRUCTOSE OR LEVULOSE). An aqueous solut. of resorcin and fructose becomes red on being heated with HCl, and furnishes a ppt. which dissolves in alcohol with red color. Cane sugar, invert sugar, and mellitose behave similarly. See *Conradi's* test.

Selle (AMMONIA). Filter-paper dipped in a tincture of blue hyacinth flowers and dried is colored green when exposed to NH_3 vapor.

Selmi (ALKALOIDS). Two reagents are employed: 1.—A sat. solut. iodic acid in conc. H_2SO_4 is diluted with 6 times its volume of the same acid. 2.—Lead peroxide is dissolved in conc. HCl, or glacial acetic acid, and the solut. filtered.

Selmi (BLOOD). The object stained with blood is extracted with NH_3 and the liquid filtered, after which the filtrate is pptd. with sodium tungstate and acetic acid. Next wash ppt., treat

with a mixture of 1 volume NH_3 and 8 volumes absolute alcohol, and filter. On evaporating off the alcohol and treating residue with NaCl and acetic acid, hemin crystals will appear upon microscopical examination.

Selmi (MORPHINE). 1.—Dissolve lead peroxide in conc. HCl or glacial acetic acid, and filter. To 1 drop solut. add 2 drops morphine solut. and evaporate very gently. The mixture changes from slightly yellow to bright-yellow, dark-yellow, and violet. 2.—Morphine dissolved in H_2SO_4 gives a violet color, which changes to green on saturating with $NaHCO_3$ and adding tincture iodine.

Selmi (PHOSPHORIC ACID). A green flame color is caused on applying a drop of liquid, or dry substance moistened with H_2SO_4, on a platinum loop, close to the lower part of a hydrogen flame.

Selmi (STRYCHNINE). Dilute a sat. solut. iodic acid in conc. H_2SO_4 with 6 volumes of the same acid. Strychnine moistened with reagent is colored yellow, brick-red, and violet-red.

Senator-Lehmann (GLOBULIN IN URINE). Dilute urine with water to a sp. gr. of 1.002-1.003, then add very dilute acetic acid, carefully avoiding an excess—globulin is pptd.

Senier (GLYCERIN). A borax bead is colored green on dipping into a slightly alkaline liquid containing glycerin, and exposing to the Bunsen flame.

Serullas (MORPHINE). Iodic acid causes a red color.

Seyda (TANNIN). Gold salts develop in dilute solut. tannin a purple color; in very dilute solut. the color is reddish. Reaction best observed in neutral and faintly acid solut.

Seyler-Hoppe. See *Hoppe-Seyler.*

Shimer (GUM AND GLYCERIN JELLY). Mix equal parts glycerin jelly (*Fol's* second formula), *Farrant's* medium, and glycerin.

Short-Dunstan. See *Dunstan-Short.*

Sieben (KETOSES AND ALDOSES). Boiled for 3 hours with 7.5-% HCl, the ketoses (fructose, sorbose), are decomposed with formation of humic acid, while the aldoses (glucose, mannose, galactose), are not affected.

Siebold (ALBUMIN). Add to urine containing albumin a slight excess of NH_3, and then a slight excess acetic acid—solut. becomes cloudy on heating to boiling.

Siebold (ALCOHOL IN CHLOROFORM). Purple color of a solut. iodine in pure chloroform is changed to reddish-brown by alcohol.

Siebold (ARSENIC IN GLYCERIN). To 1.5 Cc. glycerin in a test-tube, add 5 Cc. HCl (1 : 7), 1 Gm. pure zinc, and a few drops solut. iodine to give a very slight yellow color. Plug the tube with cotton-wool, and cover with filter-paper, on which a drop mercuric-chloride solut. has been dried. This should not show a yellow stain in 15 minutes.

Siebold (MORPHINE). A brown color develops on heating with H_2SO_4 and adding potassium perchlorate free from chlorate.

Siebold-Bradbury (SALICYLIC ACID IN URINE). Add K_2CO_3 to slight alkalinity, then excess of lead-nitrate solut.; shake, filter, and add a very dil. solut. Fe_2Cl_6—a violet color will form.

Siewer (MOTOR ACTIVITY OF STOMACH). Administer 2 Gm. salol in capsule or wafer with meal. In ¾ to 1 hour, normally, urine will react for salicyluric acid with ferric chloride.

Siewert (MOLYBDIC ACID). To a solut. molybdic acid in HNO_3, add an aqueous solut. potassium ethylsulpho-carbonate. A yellow to flesh-colored ppt. forms which soon changes to violet.

Silbermann (ALBUMIN). Albumin freed from fats gives a violet color upon heating with fuming HCl.

Silva, Da- (ESERINE). See *Da Silva.*

Simon (CINNAMIC ACID). Nitrobenzene is formed on adding potassium bichromate and H_2SO_4.

Simon (INDICATOR). Iron isopyrotritarate gives with water a solut. the red color of which is changed to violet by acids, discharged by an excess of acid, and changed to yellow by alkalies. The color changes are very sharp. For details see MERCK'S REPORT, X, p. 91.

Simon (GLYCOGEN IN URINE). Add 10 Cc. of 40-% KOH to 90 Cc. urine, filter, and to the filtrate add 10 Gm. KI and 50 Cc. 96-% alcohol. Glycogen is pptd. as a flocculent mass.

Simon (XANTHIN). Dissolve substance in KOH or NaOH and add NaCl or $CaCl_2$—nitrogen is evolved, and solut. becomes blue, then brown, and finally yellow.

Simons-Crampton (CARAMEL IN LIQUOR AND VINEGAR). See *Crampton-Simons.*

Siringo (HYDROCHLORIC ACID IN GASTRIC JUICE). Introduce 5 Cc. gastric juice into a graduated cylinder filled with mer-

cury and dipping into a mercury bath, and then introduce a small piece sodium-nitrohydroxylamine. From the NO liberated the HCl is calculated. The reaction is as follows: $Na_2N_2O_3 + 2HCl = 2NaCl + H_2O + 2NO$.

Skey (COBALT). A dark-red color develops on adding citric or tartaric acid, NH_3 in excess, and potassium ferricyanide.

Skraup (THALLIN). An emerald-green color develops on treating thallin with oxidizers (CrO_3, Br, I, $Hg(NO_3)_2$, Fe_2Cl_6).

Slater (STRYCHNINE). A maroon-red color develops on treatment with H_2SO_4 and $KClO_3$.

Smith (BILIARY PIGMENTS). Modification of *Maréchal's* test, in which tincture of iodine is carefully overlaid on urine, and the zone reaction observed. A greenish color develops.

Smith (FREE ACIDS). AgCl is pptd. from a solut. of freshly pptd. chloride dissolved in NH_3.

Smith (SANTONIN). A greenish-yellow color develops on heating with HNO_3, and changes to deep-red with alkalies.

Smith, Hopewell (DECALCIFICATION OF TEETH). Place teeth in 24 parts 10-% HCl; after 15 hours add 3 parts HNO_3, and after 48 hours add 3 parts more of the latter. After 75 to 80 hours remove the teeth and wash for half an hour in a solut. of 5 Gm. lithium carbonate in 1 oz. water.

Smith-Chapman (TARTARIC AND CITRIC ACIDS). See *Chapman-Smith.*

Smith-Chapman (UREA). Urea in alkaline solut. strongly resists, at ordinary temperatures, oxidizing action of potass. permanganate; in HCl, however, it decomposes, more readily on warming, into CO_2 and NH_3.

Smithson-Gmelin (MERCURY). See *Gmelin-Smithson.*

Snelling (EMETINE). An orange-red color, changing to violet, forms on pouring a few drops HCl upon a little $KClO_3$ and adding a drop of suspected liquid.

Snow (COLCHICINE). Shake out with a mixture of 18 Cc. chloroform, 2 Cc. alcohol 80 Cc. of petroleum ether, and 10 to 15 drops NH_3.

Soldaini (GLUCOSE). Dissolve 15 Gm. cupric carbonate in 1,400 Gm. water with the aid of 416 Gm. $KHCO_3$. Upon boiling this solution with glucose, cuprous oxide separates out. See *Ost's* copper reaction.

Sollas (GELATIN IMBEDDING). Transfer the tissue from water to melted gelatin jelly (prepared by melting gelatin after it has absorbed as much water as it can take up), and allow it to remain until well permeated. Then let mass set, and cut section, which should be transferred to a slide as soon as cut, and covered with a drop of glycerin. A cover is then put on and the mouth closed with some suitable cement. The glycerin gradually permeates the gelatin mass and converts it into glycerin jelly, the change being hastened by placing the slide in an oven kept at 20° to 30° C.

Sollman (SUGAR). Modified *Fehling's* solut., in which copper salt is replaced by a cobalt or nickel salt. With a nickel salt, the apple-green solut. gives a canary-yellow color change; with cobalt, the bluish-green solut. becomes reddish-brown. An excess of metal does not hinder reactions, as the latter occur only on boiling.

Soltsiens (SESAME OIL). Melt 2 to 3 parts of fat to be examined in a test-tube on a boiling water-bath, add a solut. stannous chloride in HCl (1 : 19) 1 part, shake well, and replace on the water-bath. Presence of sesame oil is shown by a raspberry or wine-red color in the stannous-chloride solut. Reaction will detect 1% sesame oil.

Sonnenschein (ALKALOIDS). 1.—Suspend cerous hydroxide in KOH solut. and pass Cl gas through the mixture until formation of brownish-yellow ceric hydroxide is complete. Collect, wash, and dry the hydroxide, and add a trace to a solut. of the alkaloid in H_2SO_4. For particulars of color reactions see Hager, "*Pharm. Praxis*," 1886, I, 207. 2.—Ppt. a solut. of ammonium molybdate in HNO_3 with H_3PO_4, wash ppt., boil with nitro-hydrochloric acid to drive off NH_3, evaporate to dryness, and dissolve residue in 10-% HNO_3. Weak acid solut. of alkaloidal salts give yellow ppts. with this reagent, as do also NH_3 and some other bases. Compare *Jungmann's* reaction.

Sonnenschein (BLOOD). On extracting blood stains with distilled water and pptng. with sodium-tungstate solut. strongly acidified with acetic acid, a reddish-green fluorescence appears on adding NH_3.

Sonnenschein (PROTEIN). A ppt. forms on adding a sat. solut. sodium tungstate, strongly acidulated with acetic or phosphoric acid.

Sonstadt (CALCIUM). Sodium tungstate gives a ppt. with calcium salts.

Souchere (PEANUT OIL). Separate the free fatty acids from the suspected oil and dissolve them in boiling alcohol. In the presence of peanut oil arachic acid separates out in form of characteristic pearly crystals on cooling.

Soulier (MACERATING MIXTURES). Solut. of ammonium or potassium sulphocyanide containing 10, 5, 2.5, or 1.25 per cent. are mixed with *Ripart-Petit* preservative fluid, in the proportions of 20 Cc. to 20 Cc., 30 Cc. to 10 Cc., 35 Cc. to 5 Cc., 36 Cc. to 4 Cc., 37 Cc. to 3 Cc., 38 Cc. to 2 Cc., 39 Cc. to 1 Cc., or 39.5 Cc. to 0.5 Cc., the best results being obtained with the 2.5 per cent. sulphocyanide solut. Or the Ripart-Petit fluid is mixed with *Kronecker's* artificial serum, or with pepsin, javelle water, 10-% sodium-sulphate solut., or 1.5-% NaOH solut. Solutions of NaCl, KOH, or NaOH may also be mixed with any of the usual fixing agents.

Source (URIC ACID). See *Magnier de la Source.*

Southey (OPIUM). A blue color appears on adding sulphomolybdic acid.

Souza, De- (PYRIDINE FOR HARDENING). Pyridine is recommended for hardening, dehydrating, and clearing tissues at the same time. They may be stained after hardening by means of aniline dyes dissolved in the pyridine, or passed through water and stained by the usual processes. It is said to harden quickly, and to give particularly good results with brain.

Soxhlet (MARGARINE IN FATS). 1 Gm. phenolphtalein added to 100 kilos of fat, will afford a red color if margarine present.

Spasski (BENZALDEHYDE IN BITTER-ALMOND WATER). A bitter-almond water made from benzaldehyde and hydrocyanic acid may be recognized by its chlorine content (commercial benzaldehyde is prepared from benzyl chloride, traces of which adhere even to the purified benzaldehyde). The chlorine may be dectected in the fused mass obtained by mixing 20 Cc. suspected liquid with 40 to 50 Cc. H_2O_2 and 6 to 7 Gm. NaOH, evaporating, and finally fusing.

Spee, Graf (PREPARED PARAFFIN). To prepare a mass particularly favorable for ribbon-section cutting, heat paraffin (m. p. 50° C.) in a porcelain capsule until disagreeable white vapors are given off and the mass shrinks a little. In about 1 to 6 hours, according to the quality of the paraffin, the mass becomes brownish-yellow, and, after cooling, shows a soapy surface on being cut. Its m. p. will have risen several degrees.

Spence-Esilman (MINERAL ACIDS). Free mineral acids discharge the color of very dilute aqueous solut. of Fe_2Cl_6.

Spica (SACCHARIN). Shake substance in a separatory funnel with ether-petroleum ether, filter through a dry filter-paper, and divide filtrate into 2 parts. 1.—To one part add some CaO, heat until incipient brown color, add a few Cc. water, then heat to boiling, allow to settle, pour liquid into another test-tube, and evolve H by adding HCl and metallic zinc. When evolution has proceeded for about 20 min., pour liquid into another test-tube and add to it a few drops solut. KNO_2 and delta-naphtylamine hydrochlorate—if slightest trace of saccharin is present, a carmine-red color develops in a few minutes. 2.—To the second part add a few drops H_2SO_4 and a few crystals $KMnO_4$, heat gently, then decompose residual $KMnO_4$ by oxalic acid or H_2SO_3, add a few Cc. to the liquid, pipette off a few Cc. of the lower layer of liquid, and add to this a few drops of solut. diphenylamine in conc. H_2SO_4—if saccharin present, a characteristic blue ring forms.

Spicea (SALICYLIC ACID IN WINE). Warm residue from an ethereal extract of the wine with conc. HNO_3, then supersaturate with NH_3. If salicylic acid present, it is by this treatment converted into picric acid, which can readily be identified by the yellow color a woollen fiber acquires when dipped into the solut.

Spiegel (INDICATOR). Paranitrophenol gives a very distinct yellow color with alkalies; color is discharged by acids.

Spiegel (NITRITES). Shake guaiacol with water and filter. This solut. gives with a solut. containing 0.0001 Gm. nitrite solut. an immediate orange color on adding a few drops dil. H_2SO_4. With a 0.00001 Gm. nitrite solut. the color develops in ½ to 1 hour. Oxidizing agents and iron salts in reasonable quantity have no influence on reaction.

Spiegler's (ALBUMIN). 1.—8 Gm. $HgCl_2$, 4 Gm. of tartaric acid, 200 Gm. water, and 20 Gm. sugar. 2.—Tartaric acid, 1; $HgCl_2$, 2; glycerin, 20; water, 50. The suspected urine is acidulated with acetic acid, filtered from any ppt. (mucin), and the reagent then overlaid upon the filtrate. In the presence of albumin, a white zone will appear. If urine contained iodine, a yellow flocculent ppt., soluble in alcohol, will form at the point of contact. The delicacy of *Spiegler's* test depends upon amount of chlorides in the urine. *Rafaele* therefore proposed hydrochloric instead of acetic acid in order to form chlorides. See also *Jolle's* test.

Sprengel (NITRIC ACID). Dissolve phenol, 1, in conc. H_2SO_4, 4, and water, 2. One to 2 drops of this solut. gives, in the presence of HNO_3, a reddish-brown color, sometimes green, which changes to yellow on adding NH_3. *Hager* recommends dissolving a small volume of the sample in conc. H_2SO_4, the introduction of a crystal of phenol and gentle heating. HCl may be used instead of H_2SO_4, but in this case the heating must be carried to 80° or 90° C. *Grandval* and *Lajoux* base a colorimetric test for HNO_3 on Sprengel's reaction.

Squire (ACIDULATED ALCOHOL). Add 0.5 to 1% HCl of sp. gr. 1.16 to 70-% alcohol.

Squire (ACIDULATED GLYCERIN). Mix equal parts glycerin and water, and add 1% glacial acetic acid, if sections are to be mounted in *Farrant's* medium, or 1% formic acid (sp. gr. 1.2), if glycerin is the mounting medium.

Squire (ACTINOMYCOSIS). See *Plaut's* method.

Squire (BLUING SECTIONS). After staining with hematoxylin, treat for a few seconds with a solut. of $NaHCO_3$ (1: 1,000) in distilled water.

Squire (CANADA BALSAM). Dry the balsam on a water-bath until brittle when cooled, then to each 200 Gm. add 100 Cc. benzene or rather less xylene.

Squire (DAMMAR SOLUTION). 1.—Dissolve 100 Gm. dammar in 100 Cc. of benzene. 2.—Dissolve 100 Gm. dammar in 200 Cc. turpentine oil, and add 50 Gm. mastic dissolved in 200 Cc. chloroform.

Squire (DECALCIFICATION FLUID). 1.—Mix 95 parts glycerin with 5 parts HCl; used for softening teeth. 2.—Use a 4-%

aqueous solut. of arsenic acid at a temperature of 30° to 40° C. After softening tissues in this solut., keep them in alcohol.

Squire (FARRANT'S MEDIUM). Dissolve 1 Gm. arsenous acid and 130 Gm. acacia in 200 Cc. distilled water, then add 100 Cc. glycerin. Filter through fine Swedish filter-paper upon which has been deposited a thin layer of talc.

Squire (GLYCERIN AND GUM). Dissolve 130 Gm. acacia in 200 Cc. chloroform water (1 in 200), then add 100 Cc. glycerin and filter.

Squire (GLYCERIN JELLY). Soak 100 Gm. French gelatin in chloroform water, drain when soft, and dissolve with heat in 750 Gm. glycerin. Add 400 Gm. chloroform water with which has been incorporated about 50 Gm. fresh egg albumin, mix thoroughly, and heat to boiling point or about 5 minutes. Make up the total weight to 1,550 Gm. with chloroform water and filter in a warm room.

Squire (HEMATOXYLIN STAIN). Dissolve 0.4 Gm. $NH_3(CO_3)_2$ and 2 Gm. hematoxylin in 40 Cc. dilute alcohol, and expose to the air in a shallow dish for 24 hours; make up the volume to 40 Cc. with dilute alcohol, warming, if necessary, to dissolve any separated crystals, and add 2 Gm. ammonia alum dissolved in 80 Cc. distilled water, together with 100 Cc. glycerin 80 Cc. alcohol, and 10 Cc. of glacial acetic acid. Dilute 1 part of this solut. with 9 parts distilled water when required for use.

Squire (PICRO-CARMINE). 1.—Dissolve 1 Gm. carmine with a gentle heat in 3 Cc. strong NH_3 and 5 Cc. distilled water, then add 200 Cc. of sat. aqueous solut. picric acid, heat to boiling, and filter. 2.—Dissolve 10 Gm. carmine in a solut. of 1 Gm. NaOH in 1000 Cc. distilled water; boil, filter, and make up to 1000 Cc. with water. Mix the solut. with an equal quantity water, and add 1-% aqueous solut. picric acid so long as the turbidity produced disappears on agitation.

Squire (POTASSIUM-ACETATE SOLUTION). Dissolve 250 Gm. potassium acetate in 100 Cc. water, by the aid of gentle heat, and filter. This is used as a mounting medium.

Squire (STRENGTHS OF ALCOHOL). The useful formulas for different strengths of alcohol published by Squire are sufficiently exact for all practical purposes. Absolute alcohol

(sp. gr. 0.797) containing about 98% ethylic alcohol is taken as the basis in most instances. Alcohol of 90% (sp. gr. 0.823) is prepared by mixing 14 volumes absolute alcohol and 1 volume of distilled water; 84-% alcohol (sp. gr. 0.838) is rectified spirit, B. P.; 70-% alcohol (sp. gr. 0.872) may be obtained by adding 1 volume distilled water to 3 volumes absolute alcohol, 6 volumes rectified spirit, or 4 volumes methylated spirit; 50-% alcohol (sp. gr. 0.918) is prepared by adding 4 volumes distilled water to 5 volumes absolute alcohol, 3 volumes of water to 5 volumes of rectified spirit, or 3.5 volumes water to 5 volumes methylated spirit. Absolute alcohol, 75 Cc., mixed with acetic acid, 25 Cc., serves as an excellent fixing agent for nuclei. Immerse tissues in it for 6 to 12 hours, then transfer to 90-% alcohol until hardened, afterward preserving in 70-% alcohol till wanted.

Squire (TREATMENT OF SECTIONS). Imbed tissues to be cut in paraffin melting between 45° and 50° C., according to the temperature of the room and the nature of the material. Afterward preserve sections, prior to staining and mounting in 50-% alcohol, or in a mixture of equal volumes glycerin and thymol water (1 in 1,500) Sections may be conveniently washed in alcohol, dehydrated, and cleared, in small wide-mouthed bottles.

Stadthagen (URIC ACID). Warm substance with alkaline solut. arsenous acid, and add solut. $CuSO_4$—a ppt. of red cuprous oxide or white copper urate forms.

Staedeler (CHLOROFORM). On dissolving bilirubin in pure chloroform a yellow color develops. A green color indicates decomposition.

Staedeler-Piria (TYROSIN). See *Piria-Staedeler.*

Stahl (TEST-PAPER). Filter-paper saturated with a 1- to 5-% solut. of cobaltous chloride is blue when dry, but assumes a reddish color in moist air. See *Merget's* test.

Stahre (CITRIC ACID). On oxidizing citric acid with $KMnO_4$ and adding bromine water, a white ppt. soluble in ether forms. In this citric-acid reaction there is formed acetone-dicarbonic acid which reacts with bromine water to form penta-brom-acetone, as a white ppt. The acetone-dicarbonic acid melts at 73° C., and gradually decomposes into acetone and carbonic

acid, but more quickly on heating. Oxalic acid occurs as a secondary oxidation product.

Standford (IODINE). A violet color develops on adding carbon disulphide and 1 drop of nitro-sulphuric acid, prepared by saturating H_2SO_4 (sp. gr. 1.843) with gaseous nitrous anhydride.

Stas-Otto (ALKALOIDS). Alkaloids are divided into three groups according to their property (1) of being taken up by ether from acid solutions; (2) of being taken up by ether from alkaline solutions; (3) of not being taken up by ether from alkaline solutions (morphine). See also *Otto-Stas*.

Steenbuch (FLOUR). To examine flour remove starch by the action of diastase, pour into water, and remove albuminous matter with a weak solution of soda, then examine residue under the microscope.

Stefanelli (ALCOHOL IN ETHER). Aniline violet is insoluble in pure ether, but is soluble in alcohol.

Stein (NARCEINE). A blue color results on adding to a liquid containing narceine a solut. zinc and potassium iodides, together with a drop of aqueous solut. iodine.

Stein (NITRIC ACID). On heating a nitrate with litharge and exposing filter-paper moistened with an acid solut. of ferrous sulphate to the gas evolved, the paper is colored yellow to brown.

Steinschneider-Galewski (GONOCOCCI STAIN). To differentiate from other diplococci, place preparation in aniline gentian-violet for 25 to 30 minutes and wash; then place in solut. KI for 1 to 5 minutes; then in alcohol until decolorized. Again wash and dry, and after-stain several seconds in Loeffler's methylene-blue solut. Gonococci are stained lightly; other diplococci darkly.

Stenhouse (CAFFEINE). Upon heating caffeine for a few minutes with fuming HNO_3, evaporating the yellow solut. to dryness, and moistening residue with NH_3, a purple color similar to that of murexid forms, and disappears on adding KOH (the murexid color is changed to blue).

Stephenson (MOUNTING MEDIUM). A solut. HgI_2 in KI solut., of specific gravity 3.02.

Sterling (STAIN). Gentian violet 10 Gm.; aniline, 4 Gm.; 95-% alcohol, 20 Gm.; water, 176 Cc. Add the aniline to the

alcohol, and dissolve the Gentian violet in the water. Add the latter solut. gradually to the aniline solut., shaking well after each addition, and then filter.

Sternberg (ACETONE). On adding a few drops H_3PO_4, some $CuSO_4$ and KI to a solut. of acetone, and warming, a voluminous, grayish-white ppt. forms, the liquid becoming decolorized. Reaction very sensitive. Normal urine gives the reaction, but test may be carried out with urine distillate.

Stevenin (INDICTOR). A glycerin extract of the petals of violet or mallow flowers is turned red by acids and green by alkalies.

Stevenson (HEMOGLOBIN IN URINE). Add 1 drop tincture guaiac and a few drops ozonized ether to 1 or 2 drops urine, shake, and let ozonized ether settle—latter acquires a blue color. Modified *Mahomed's* test.

Stieda (CEMENTS). 1.—Rub up zinc oxide with turpentine, and for each dram of oxide add 1 oz. thick solut. dammar in turpentine. 2.—Replace zinc oxide by vermilion and add 1 oz. of dammar solut. for each 2 drams.

Stile (DOUBLE-STAINING SECTIONS). First bleach in a solut. chlorinated lime, then wash with solut. sodium thiosulphate (1:4). Make the red stain from rosaniline acetate, ½ grain, and alcohol, 1 fl. oz. For blue stain, dissolve soluble blue, ½ grain, in 1 fl. dram distilled water, 10 minims dil. HNO_3, and 2 fl. drams alcohol. Immerse section first in the red stain for 2 to 40 minutes, then wash with alcohol; next immerse in blue stain, and again wash out, and drain. Clear in oil cajuput, transfer to turpentine, and mount in balsam. By clearing in xylene, section may be transferred direct to xylene balsam. Bleaching may also be effected by treating sections with H_2O_2.

Stillingfleet-Johnson (CEATININE IN URINE). This is a modification of *Marly's* separation process. A large volume of urine is treated with 5% of its volume sat. aqueous solut. sodium acetate and 25% sat. solut. $HgCl_2$. The ppt. is filtered immediately and the filtrate left for 48 hours. The creatinine separates in microscopic spherical masses of mercuric-chloride compound, and is collected, washed with cold water, and decomposed by H_2S. The liquid is decolorized with animal charcoal and evaporated over H_2SO_4, when creatinine hydrochlorate crystallizes out. This salt is decomposed with excess

of lead hydrate, and the filtrate, evaporated over H_2SO_4, gives effloresced crystals of creatinine.

Stirling (DISSOCIATING MEDIUM). 10-% solut. of ammonium- or potassium sulphocyanide. Macerate small pieces of epithelium in solut. for 24 to 48 hours.

Stock (ACETONE IN URINE). *A. Frohner* employs chlorinated-lime solution instead of bromine water and pyridine.

Stoddart (MEDIUM FOR TYPHOID BACILLI). Mix equal parts of ordinary meat-infusion, peptone-agar-agar (1-% agar-agar), and meat-infusion-peptone-gelatin (10-% gelatin). The proportion of agar-agar present is, obviously, 0.5%, and that of the gelatin, 5%. These quantities just suffice to keep the medium solid at 35° C.

Stoeder (ALOES). Solut. $CuSO_4$ added to aloes triturated with water, develops a canary-yellow color, changed to cherry-red on adding very dilute HCN. According to *Heuberger*, Barbadoes aloes thus treated gives a reddish-violet, while Natal aloes gives a pale orange.

Stoeder (DIFFERENTIATING EXTRACTS OF BELLADONNA AND HENBANE). Shake a solut. of 0.1 Gm. extract in 2 Cc. water, with 10 Cc. ether, which then shake with 5 Cc. water and 2 drops NH_3—with extract belladonna a blue fluorescence is observed in the ammoniacal liquid.

Stolba (POTASSIUM SALTS). Sodium- or ammonium fluoboride gives a crystalline ppt. with potassium salts, which colors a Bunsen flame green, then violet.

Stolba (STANDARDIZING PERMANGANATE SOLUTIONS). Lead oxalate is used like oxalic acid for standardizing permanganate solutions, the salt being first warmed with H_2SO_4. One Gm. lead oxalate = 0.428 Gm. oxalic acid.

Storch (INDICATOR). 1.—Benzopurpurine B. Gives a brownish-red color with alkalies and bluish-violet with acids. 2.—Curcumin W. Gives a red color with alkalies and a greenish-yellow with acids.

Storch (ROSIN OIL IN OIL MIXTURES). From 1 to 2 Cc. oil are shaken with 1 Cc. acetic anhydride, allowed to stand, and the acetic anhydride, separated by means of a pipette, treated with a drop of conc. H_2SO_4. In the presence of rosin oil a

violet-red color appears. *Morawski* recommends H_2SO_4 of specific gravity 1.53.

Storch-Morawski (ROSIN OIL AND RESIN). Dissolve out resin in acetic anhydride, and mix with H_2SO_4 (sp. gr. 1.53)—a red color indicates addition of resin to fats and varnishes. Copals give a brown color reaction with this test.

Storer (CHROMIC ACID). An intense blue is given with an ethereal solut. H_2O_2.

Strassburg (BILIARY ACIDS). See *Pettenkofer's* test.

Strecker (XANTHIN). Evaporate to dryness with HNO_3, add NaOH or KOH—a yellow residue results, turning reddish-yellow on adding KOH or NaOH, and becoming reddish-violet on subsequent warming. Reaction not obtained with NH_3—distinction from uric acid.

Streng (SODIUM SALTS). Minute, yellow crystals form on adding solut. uranium acetate. Crystals may be examined by polarized light under microscope.

Stricker (IMBEDDING MASS). Prepare objects in alcohol, and imbed in conc. solut. acacia in a paper case, then immerse whole in alcohol, and cut after 2 or 3 days.

Strobel (ACETANILID). Acetanilid heated with zinc chloride gives off aromatic vapors which color wood shavings yellow; residue is also yellow.

Strobel (ANTINERVIN). Behaves like acetanilid (see above).

Strobel (ANTIPYRINE). Vapors evolved on heating antipyrine with zinc chloride have an odor like that of methylamine or cacodyl, and color wood shavings cherry-red, the residue being reddish-yellow with greenish fluorescence by reflected light.

Strobel (MIGRANIN). Behaves like antipyrine (see above).

Strobel (PHENACETIN). Vapors of phenacetin heated with zinc chloride color wood shavings yellow, but residue is reddish-yellow (with acetanilid it is yellow).

Strobel (SALIPYRINE). Behaves like antipyrine (see above).

Strobel (SALOL). Salol, on heating with zinc chloride, decomposes into phenol and a salicylate, and the vapors evolved color paper moistened with Fe_2Cl_6 solut. a dirty green, changed to violet on washing with water.

Strobel (SULFONAL). Sulfonal heated with zinc chloride develops odor of mercaptan and partially sublimes.

Strohl (MINERAL ACIDS IN VINEGAR). If free mineral acid present in vinegar, no ppt. forms on adding ammonium oxalate and calcium chloride.

Stroppa-Vitali (CONIINE). 1.—Stir coniine or one of its salts with a few drops solut. of 1 potassium permanganate in 200 conc. H_2SO_4—green color of solut. changes to violet. 2.—Carefully evaporate small quantity coniine with conc. HNO_3—a dark-yellow residue remains which, on treatment with KOH, yields a reddish-brown oil having a characteristic hemlock odor, and which, on evaporation to dryness, gives a brownish-black residue soluble in conc. H_2SO to an almost colorless solut. changed by a little water and excess of NH_4 to yellow.

Struve (BLOOD). Extract suspected stains with dilute caustic-potassa solut., filter, and add tannin. A reddish-brown color indicates presence of blood; and, on acidulating with acetic acid, a ppt. develops, which will yield hemin crystals after washing and treatment with acetic acid and NaCl. See also *Selmi's* test for blood, and *Teichmann's* hemin crystals. Urine containing blood yields a reddish ppt. upon adding caustic soda and tannin, and subsequently acidulating with acetic acid.

Struve (HYDROGEN DIOXIDE). A blue color develops on treating with an alkaline solution of litharge and a dilute solut. lead subacetate, then testing with KI starch paste and acetic acid. The reaction requires several hours.

Strzyzowski (ALKALOIDS). Various reactions are afforded with chloral, bromal, paraldehyde, furfurol, and ortho-nitrophenyl propiolic acid. For details see MERCK'S REPORT, VII., p. 534.

Stuart (ALCOHOL IN ESSENTIAL OILS). Iodoform is formed on distilling off the alcohol, and adding compound tinct. iodine (U.S.P., 1890), together with potassa solut.

Studenski (UROBILIN IN URINE). Treat 20 Cc. urine with 2 Cc. of sat. solut. $CuSO_4$, saturate mixture with crystallized $(NH_4)_2SO_4$, add 10 Cc. chloroform, and shake mixture for some minutes. The chloroform is then separated, evaporated, and the residue weighed.

Stutz (ALBUMIN). Fill capsules with *Fuerbringer's* reagent, which see.

Suchannek (MOUNTING MEDIUM). Mix equal parts of Venice turpentine and absolute alcohol, agitate frequently, and keep in a stove until clear.

Sulzer (ALCOHOL IN ESSENTIAL OILS). See *Salzer;* also *Puscher's* test.

Svanberg (PHOSPHORIC ACID). A yellow ppt. forms on adding ammonium-molybdate solut. in large excess.

Symons (SODIUM IN LITHIUM CARBONATE). Dissolve 10 Gm. lithium carbonate in a tared flask containing 100 Cc. water, boil, and bring weight of liquid to 100 Gm.; then take 50 Gm., evaporate to dryness, treat with 15 Cc. HCl in which NaCl has been dissolved to saturation. Throw insoluble residue on a filter, and wash, first with 10 Cc. of the salted acid, then with 10 Cc. pure acid. Then place insol. residue in a tared dish, dry, and weigh. The weight multiplied by 20 equals the percentage of NaCl.

Szabo (HYDROCHLORIC ACID IN GASTRIC JUICE). Mixture of equal volumes 0.5-% solutions of ammonium rhodanate and sodium ferritartrate. Reagent is colored brown by free HCl. See *Mohr's* test.

Szobolew (SAFRANINE STAIN). Immerse sections for 2 to 5 minutes in diluted *Flemming's* solut. (10 to 15 drops to 5 Cc. water) wash with water, stain in sat. aqueous solut. safranine, and mount as usual.

Tafel (STRYCHNINE). Add an excess HCl to solut. strychnine, then add a small fragment zinc, or sodium amalgam. When evolution of gas ceases, add a little Fe_2Cl_6—a yellowish-red color develops, permanent even in boiling solut.

Taguchi (INK INJECTION). Rub Chinese ink well with water until resulting fluid does not run when dropped on thin blotting-paper or form a gray ring round the drop. The preparation is injected with this fluid until it appears quite black, and it is then thrown into some hardening liquid.

Tambon (SESAME OIL). Shake 1 vol. of a solut. of 3 to 4 parts pure crystalline glucose in 100 parts HCl, with 2 vol. oil, for 2 to 3 minutes, then warm emulsion over a spirit flame to boiling and agitate—if least trace of sesame oil is present a fine rose color with violet tint, passing to cherry-red, develops. Pure olive oil gives no reaction; if 1 to 5% sesame oil is

present, color develops in a few minutes; if 10% present, color is immediate.

Tangl (ALUM CARMINE). Boil powdered carmine in sat. solut. alum for 10 minutes and filter resulting solut.

Tanret (ALBUMIN). Dissolve 3.32 Gm. KCl and 1.35 Gm. $HgCl_2$ in 20 Cc. of acetic acid, then dilute with water to 60 Cc. With albuminous urine reagent yields a white ppt. insoluble in acetic acid. Peptones cause precipitates which redissolve on boiling; alkaloids give ppts. soluble in alcohol. Compare *Mayer's* reagent.

Tartuferi (SILVER IMPREGNATION METHOD). Place a cornea for 3 days or more in a solut. of 15 Gm. $Na_2S_2O_3$ in 100 Cc. dist. water, kept at a temperature of about 26° C., then remove for 2 days into water containing very finely divided AgCl in suspension.

Tassinari-Piazza (NITRIC ACID). On treatment with potassa and zinc dust NH_3 forms.

Tattersall (COBALT). A blood-red color develops on adding KCN solut. till the ppt. formed is redissolved, then adding a few drops yellow ammonium-sulphide solut.

Tattersall (DELPHININE). An orange color, changing to pink and violet, develops on rubbing with malic acid, and then with a few drops H_2SO_4.

Tattersall (MORPHINE, CODEINE, AND PAPAVERINE). A dirty-violet color, changing to sea-green, develops on dissolving *morphine* in conc. H_2SO_4 and adding a little sodium arsenate. *Codeine* yields a blue color when similarly treated, and this changes to orange on adding water and excess of soda. *Papaverine* gives a red to violet color on treatment as above and heating, while the addition of water and excess of soda turns the color nearly black.

Teichmann (BLOOD). Treat 2 or 3 Cc. of a not too dilute aqueous solut. of blood with a few drops glacial acetic acid and about 0.01 Gm. NaCl. On evaporating a few drops of mixture on a cover-glass and examining under the microscope, dark-brown rhombic needles or plates of hemin will be visible. See also *Struve's* and *Selmi's* tests.

Teichmann-Heller (BLOOD IN URINE). See *Heller-Teichmann.*

Terreill (CELLULOSE). A blue color appears on dipping into a 1-% KI solut., then drying, immersing in H_2SO_4, and rinsing in water.

Tessier (IODINE). In the presence of tannin, iodine is liberated by adding tinct. ferric chloride, and produces a blue color on testing with starch paper.

Teubner (MERCURY). If mercury be present, a white stain is produced on heating substance in a crucible and allowing the vapors given off to strike a small spot on a cold gold plate.

Thénard (ALUMINIUM). On igniting with cobalt salts, aluminium oxide—separated from compounds by igniting on charcoal, with the addition of sodium carbonate if necessary—is converted into *Thénard's* blue.

Thiersch (BORAX CARMINE). Carmine, 0.5 Gm.; borax, 2 Gm.; water, 28 Cc.; absolute alcohol, 60 Cc. Filter. Soak sections in boric-acid solut. before staining.

Thiersch (CARMINE INJECTION MASS). Dissolve 1 part carmine in 1 part strong solut. ammonia and 3 parts of water, and filter. Then dissolve 1 part gelatin in 2 parts water, warm to 31° C. on a water-bath, and add 1 part carmine solut. to 3 or 4 parts gelatin solut. Next add acetic acid, drop by drop, stirring continually, until the ammonia is neutralized; or drive off the ammonia by heating to 31° to 38° C. Inject at a temperature not exceeding 44° C., then cool the preparation on ice, and subsequently harden in alcohol.

Thiersch (GREEN INJECTION MASS). The Prussian-blue and lead-chromate masses are mixed in varying proportions.

Thiersch (LEAD-CHROMATE INJECTION MASS). Mix 4 parts aqueous gelatin solut. (1 : 2) with 2 parts aqueous lead-nitrate solut. (1 : 11), and a similar quantity with 1 part aqueous potassium-chromate solut. (1 : 11). Heat both mixtures to 31° C., then mix together with continual stirring until all lead chromate is pptd., after which heat on a water-bath to 88° C., and filter through flannel. This mass will not keep, as the gelatin gradually becomes insoluble.

Thiersch (LILAC BORAX CARMINE). Dissolve 1 part carmine and 4 parts borax in 56 parts dist. water; to each vol. of solut. add 2 vol. absolute alcohol, and filter.

Thiersch (OXALIC-ACID CARMINE). 1.—Dissolve 1 part carmine in 1 of strong solut. ammonia and 3 parts water; to each vol. of solution add 8 vol. of an aqueous solut. oxalic acid (1:22), then add 12 vol. absolute alcohol, and filter. 2.—Carmine, 1 Gm.; ammonia, 1 Cc.; water, 3 Cc. Mix with solut. oxalic acid 8 Gm. in water 175 Gm., then add 16 Cc. absolute alcohol, and filter. The addition of oxalic acid causes filtrate to assume an orange hue, while ammonia changes it to violet.

Thiersch (OXALIC-ACID INDIGO CARMINE). Make a sat. solut. of commercial indigo-carmine in aqueous solut. oxalic acid (1:22 to 30), and dilute, if required, with alcohol.

Thiersch (PRUSSIAN-BLUE INJECTION MASS). Mix 12 Cc. sat. aqueous solut. ferrous sulphate with 28 Gm. aqueous gelatin solut. (1 in 2) at 31° C., then mix at same temperature 24. Cc. sat. aqueous solut. potassium ferricyanide with 56 Gm gelatin solut. To the second mixture add 24 Cc. sat. aqueous solut. oxalic acid, stir well, then add first mixture. Stir continually, keeping temperature at 25° to 31° C., until all the Prussian blue is pptd. Finally, heat on a water-bath to about 88° C., and filter through flannel.

Thoma (DECALCIFICATION METHOD). Place bones in a mixture of 5 vol. 95-% alcohol and 1 vol. pure conc. HNO_3, and change the liquid every 2 or 3 days for 2 or 3 weeks. When decalcification complete, wash out every trace of acid in 95-% alcohol containing an excess of pptd. chalk. This may take 8 to 14 days, after which the tissues may be stained and otherwise treated as desired.

Thomas (STRYCHNINE AND MORPHINE). In the presence of morphine, strychnine can be separated by dissolving it in chloroform; potassa solut. dissolves morphine, but not strychnine.

Thompson (THEINE). A blood-red residue remains on passing a current of hypochlorous acid gas through a solut. of theine and evaporating.

Thoms (COPPER SULPHATE). Traces of copper sulphate give a blue color of with a solut. of KI mixed with a little starch.

Thoms (IODINE IN COMPOUNDS). Heat substance (organic or inorganic) with conc. H_2SO_4—this liberates iodine, which may be recognized by its violet-blue vapors. If iodine present as

iodic acid, add a little zinc dust to substance before heating with H_2SO_4.

Thoms (PHENOLS, ETC.). Formaldehyde-sulphuric acid affords reactions with different methods, etc., as follows:

Salicylic acid—immediate pink to bright rose-red, becoming purple-red on heating. *Carbolic acid*—purple-red. *Resorcin*—yellow, then reddish, finally, orange (cold or hot). *Phloroglucin* (*trioxybenzene*)—red. *Benzoic acid*—no reaction. *Cinnamic acid*—cold: reddish-brown; heated: dark-brown. *Creosote*—dark blood-red, finally blackish-red. *Naphtol*—cold: yellow, changing to dirty-green. *Naphtalin*—heated: a steel-grayish-blue pellicle. *Acetone*—brown. *Thymol*—cold: yellow; heated: pink. *Benzene*—brown ppt. *Toluene*—dark-brown ppt. *Xylene*—orange-red ppt. *Benzin*—no reaction.

Thomson (IODINE). A blue color develops on passing chlorine through the solut. and testing with starch paste.

Thormaehlen (MELANIN IN URINE). Urine containing melanin is colored deep-blue on adding sodium nitroprussiate, caustic potassa, and acetic acid.

Thoulet (LIQUID). A solut. of 1 part KI and 1.239 $HgCl_2$ in water, and evaporating until it has a specific gravity of 3.196, is used for mechanical preparation of powdered minerals. Compare *Klein's* liquid.

Thresh (ALCOHOL). Convert alcohol into aldehyde by distilling off 20 Cc. from 100 Cc. of suspected liquid, mixed with 2 Cc. of sat. potassium-bichromate solut. and 8 Cc. dil. H_2SO_4 (1:1). On adding 3 Cc. soda solut., boiling for a few seconds and cooling, a yellow color develops.

Thresh (ALKALOIDS). 1.—Solut. of 1.8 Gm. KI in 45 Cc. HCl and 30 Cc. bismuth solut. (Liq. Bism. et Amm. Citr., B. P.) prepared as follows: 2.5 Gm. bismuth are dissolved in 70 Gm. HNO_3, 60 Gm. citric acid added, then enough NH_3 to faint alkalinity, and enough water to make 600 Cc. Reagent gives reddish-brown colors and ppts. with alkaloids. 2.—According to another formula, dissolve 4.68 Gm. bismuth oxide in 80 Cc. HCl, and add water to 300 Cc.; then dissolve 20 Gm. KI in water to make 700 Cc., and mix two solutions.

Thresh (BISMUTH). An orange-red to yellow color develops on adding a little HCl to the suspected liquid, followed by KI.

Thresh (SULPHURIC ACID). When a known quantity of $BaCl_2$ solut. is added to a solut. (vinegar) containing sulphates and free H_2SO_4, on evaporating the liquid and igniting there will be a loss of chlorine equivalent to the free H_2SO_4 present.

Thudichum (CREATININE). Add substance to a dil. solut. Fe_2Cl_6—dark-red color develops, increased by heating.

Thudichum (EGG COLORING MATTER). Coloring matter of egg-yolk, extracted by ether, alcohol, or chloroform, is colored by HNO_3, first blue, then yellow, and gives characteristic absorption spectra. Commercial products cannot be tested by this reaction, as the coloring matter in them is decomposed.

Thwaites (PRESERVATIVE FLUID). Saturate 1 fl. oz. alcohol with creosote, mix with chalk in a mortar, and gradually add 16 fl. oz. water. Next add 16 fl. oz. camphor water, allow mixture to stand for a few days, and filter. Compare *Beale's* modification.

Tidy (ALBUMIN). 1.—A white ppt. forms on adding equal volumes carbolic and glacial acetic acids. 2.—Add to suspected urine 15 drops alcohol, followed by 15 drops of carbolic acid.

Tidy (OXYGEN PROCESS). 1.—*Acid solution:* H_2SO_4, 1 vol.; water, 3 vol.; $KMnO_4$, sufficient to give pinkish tint. 2.—*Standard permanganate solution:* $KMnO_4$, 0.395 Gm.; water, 1 liter. 1 Cc. = 0.0001 Gm. oxygen. 3.—*Solution of sodium thiosulphate:* 1 Gm. in 1 liter of water. 4.—*Solut.* KI, 10-%. Wash out the flask with strong H_2SO_4. Take 250 Cc. water to be examined, warm to 176° C., add 10 Cc. permanganate solution and 10 Cc. acid solution, allow to stand in the dark at 176° for 4 hours. If color fades materially before that time, add another 10 Cc. Then add a few drops KI and titrate with $Na_2S_2O_3$ solut., using starch at end. Titrate a blank experiment with 250 Cc. of distilled water; the difference indicates the oxygen absorbed.

Tiedemann-Gmelin (BILE PIGMENTS). See *Gmelin* (*Heintz's* modification).

Tilden (ALOIN). To aloin or powdered aloes on white porcelain add HNO_3; no color-change indicates socaloin; crimson color, nataloin or barbaloin. To another portion add H_2SO_4 and expose to fumes of HNO_3—a blue color indicates nataloin, and no blue color barbaloin.

Tilden (IODINE). $KMnO_4$ liberates iodine from its combinations, and it may then be tested for as most convenient.

Tizzoni (IRON IN TISSUES). Treat section of tissue with 2-% solut. potass. ferrocyanide, then with 0.5-% HCl—a blue color develops.

Tocher (SESAME OIL IN OTHER OILS). The following tests are said to detect presence of even 1%: 1.—*Ammonium-vanadate* test: 2 Gm. ammonium vanadate, 50 Cc. water, and 100 Cc. H_2SO_4. Shaken with this reagent, sesame oil gives an immediate green, rapidly changing to a greenish-black. Other oils give at first no reaction, but only later a blackish color. 2.—*Formaldehyde* test: 100 Cc. H_2SO_4, 50 Cc. water, and 10 Cc. conc. formaldehyde. Shaken with an equal vol. of reagent, sesame oil gives an emulsion acquiring gradually an intense, permanent bluish-black color. 3.—*Resorcin* test: Mix 2 Cc. each of oil and benzin, saturate with resorcin, and add 2 Cc. HNO_3 (sp. gr. 1.38) free from nitrous acid. Sesame oil gives immediately an intense, bluish-violet color. For details, see MERCK'S REPORT, IX., p. 161. 4.—*Tocher's modification of Baudouin's* test: 2 Gm. pyrogallol are dissolved in 30 Cc. HCl (sp. gr. 1.19?), and 15 Gm. of this solut. shaken with an equal volume oil. After allowing two layers to form, the acid solut. is removed with a pipette and warmed for five minutes. In the presence of benne oil, a bluish-red color forms.

Toepfer (HYDROCHLORIC ACID IN GASTRIC JUICE). To 5 Cc. filtrate from gastric juice add 1 drop 1-% solut. phenolphtalein and 1 drop 0.5-% solut. dimethylamidoazobenzene; then add decinormal NaOH until red color disappears, and solut. turns yellow. The number of Cc. NaOH solut. used multiplied by 20 gives free HCl present. Continue to add NaOH until a red color appears. The total Cc. then used multiplied by 20 equals total acidity.

Toison (BLOOD STAIN). Methyl violet 5B, 0.25; sodium chloride, 1; sodium sulphate, 8; glycerin (30° Bé.), 30 Cc.; dist. water, 160 Cc. Dissolve methyl violet in glycerin with half the water, and add to solut. of the two salts in balance of water. White corpuscles stain in this in 5 to 10 minutes;

maximum coloration attained in 20 to 30 minutes. White corpuscles, violet; red corpuscles, greenish.

Tollens (ALDEHYDE). Test depends upon the reduction of a solut. of 3 parts $AgNO_3$ in 30 parts of NH_3, to which a solut. 3 parts caustic soda in 30 parts water has been added. A silver mirror forms.

Tollens (GLUCOSE). Ppt. $AgNO_3$ solut. with potassa and add just enough NH_3 to dissolve the ppt. formed. Solution is reduced by glucose.

Tollens (PENTOSE). Pentoses are colored cherry-red on being heated with HCl and phloroglucin.

Tommasi (CARBOLIC ACID). A shaving is colored blue on first dipping into carbolic acid and then into a mixture of 50 Gm. HCl, 50 Gm. water, and 0.2 Gm. potassium chlorate. See *Hoppe-Seyler's* test.

Topping (IMBEDDING SOLUTION FOR MICROSCOPICAL PREPARATIONS). 1 part of absolute alcohol and 5 parts water; in place of the latter, 4 parts water and 1 part aluminium acetate may be taken. The solut. is mixed with an equal vol. of glycerin before using.

Tortelli-Ruggieri (COTTONSEED OIL). Modified *Becchi's* test. In this test the oil is first saponified, then converted into a lead soap. This is then treated with ether, the ethereal solut. washed with HCl, the solvent then evaporated, and the residue treated with silver-nitrate solut. For details, see MERCK'S REPORT, VII., p. 403.

Tourneux-Hermann (SILVER STAINING METHOD). The tissues are left in silver-nitrate bath (3 : 1,000) for 1 hour, then washed out with 30-% alcohol.

Trapp (VERATRINE). A dark-red to violet or purple color develops on heating cautiously with HCl.

Traub (HYDROGEN DIOXIDE). Add to 6 Cc. of the liquid a little H_2SO_4, some zinc-iodide-starch paste, 2 drops 2-% solut. $CuSO_4$, and, finally, a little 0.5-% ferrous-sulphate solut.—if H_2O_2 present, a blue color forms.

Trenkmann (MACERATING FLUID). 1.—Solut. containing 1% tannin and 0.5% HCl. 2.—Sat. solut. catechu (from soaking catechu powd. in water several days and filtering), 4 parts; sat. aqueous solut. carbolic acid, 1 part.

Trenkmann (STAINING FLAGELLA). Mordant for 2 to 12 hours at normal temperature in a 1-% solut. tannin in 0.5-% HCl. Then wash in water, stain 2 to 4 hours with a mixture of 2 drops saturated alcoholic solut. fuchsine and 20 drops 1-% carbolic acid, and again wash.

Trétrop (ALBUMIN IN URINE). Heat 4 to 5 Cc. of non-alkaline urine in a test-tube to near boiling, then stop heating, and add a few drops strong formaldehyde. If the urine contains any albumin this coagulates, the flocculent mass collecting on the surface of the urine and adhering to the walls of the tube. The albumin may be determined by weighing. Certain urines when strongly albuminous are said to give a reaction in the cold.

Treumann (THEOBROMINE). A purple color develops on evaporating to dryness a mixture of theobromine and chlorine water, and then adding ammonia.

Triollet (BILIARY PIGMENTS). Improved *Gmelin's* test. Mix 50 Cc. urine and 40 to 50 Gm. ammonium sulphate, filter through cotton, and treat latter (which retained the pptd. pigments) with hot chloroform. Then evaporate chloroformic solut. of bilirubin. Next treat cotton with hot alcohol, which dissolves out the biliverdin and biliprasin. Evaporate alcohol, mix the two residues and extract with boiling water, then overlay the solut. on fuming HNO_3—2 zones appear, one a bright-red, the other yellow. After 15 minutes a blue color develops between the two zones.

Trommer (GLUCOSE). Add 1 or 2 drops solut. $CuSO_4$ and 4 to 5 Cc. NaOH solut. to a dilute grape-sugar solut.—ppt. formed will redissolve, and upon heating, yield cuprous oxide. (Compare with *Fehling's* solution.) In examining urine, the latter is rendered alkaline with NaOH, and then $CuSO_4$ solut. added by drops until a permanent ppt. appears. If glucose present, yellow cuprous oxide forms on heating. *Focke* recommends also, in order to remove other reducing agents that might be present, to first boil 10 Cc. urine with 5 Cc. $CuSO_4$ solut. (1 : 10), 2 Cc. Na_2CO_3 solut. (1 : 10) being added to the cooled filtrate, the solut. filtered after standing, and the filtrate tested according to *Trommer's* test. See *Johnson's* reaction.

Trommsdorf (NITROUS ACID). A blue color is developed with H_2SO_4 and potassium-iodide starch paste.

Troost (BROMINE). Fluorescein is added to the solut., and is thus converted into eosine or the tetrabrom derivative. If fluorescein paper be used, 0.001 Gm., of an alkali bromide in 5 to 10 Gm. NaCl is detected with certainty. The paper needs but be moistened. Test not applicable, however, in a mixture of free bromine and iodine.

Trotarelli (ALKALOID). Evaporate with conc. HNO_3, and subsequently treat residue with alcoholic KOH solut.—various alkaloids yield characteristic color reactions. Compare with *Vitali's* test.

Trotarelli (PTOMAINES). Add sodium nitro-ferricyanide and subsequently palladium nitrate to the sulphuric-acid salts of ptomaines—various color reactions occur. Compare with *Vitali's* test.

Trousseau-Dumontpallier (BILIARY PIGMENTS). See *Dumontpallier-Trousseau.*

Tscheppe (ALCOHOL). 70-% HNO_3 is overlaid on liquid to be tested. If alcohol present, a green color forms at the zone of contact; after some time gas will be evolved and the odor of ethyl nitrite become apparent.

Tschirch (COPPER IN PRESERVES). 1.—Evaporate alcoholic extract of substance to dryness, wash residue with H_2O, and treat with conc. HCl. Pure chlorophyll gives a deep-blue solut. and a residue soluble in ether with brown color. If copper present, residue dissolves in alcohol with green color. 2.—Add HCl to alcoholic extract—if green color develops, copper is present.

Tschugaeff (CHOLESTERIN). On dissolving cholesterin in glacial acetic acid, adding an excess acetyl chloride, and then a small fragment $ZnCl_2$, and finally warming for 5 minutes, the fluid acquires a red or pink color with a greenish-yellow fluorescence. Coloration still visible in a 1 : 80,000 solut. cholesterin.

Tuchen (ETHEREAL OILS). Many ethereal oils fulminate when 4 to 6 drops of the oil are brought into contact with 0.1 Gm. iodine.

Tucholka (BISABOL MYRRH). Mix 6 drops of a 1 : 15 ethereal extract of sample with 3 Cc. glacial acetic acid in a test-tube, and overlay on 3 Cc. conc. H_2SO_4. At contact-line a pink zone devel-

ops immediately, gradually spreading to the acetic-acid layer, and remaining some time. Herabol myrrh gives only a very slight pink color, the zone being first green, then changing to brown with green fluorescence after standing some time.

Tullberg (NARCOTIZATION METHOD). For actiniæ, slowly add to the water containing the expanded animal a 33-% solut. $MgCl_2$, until the vessel contains 1% salt, *i.e.*, add 33 Cc. solution for each liter sea-water. The operation should be finished within half an hour, and the animal may be fixed half an hour later. For terrestrial and fresh-water invertebrates, use rather stronger solutions.

Turner (BORAX). Borax gives a green color on being heated in the blowpipe flame with a mixture of 9 parts potassium bisulphate and 1 part fluorspar.

Tyson (HETERO-ALBUMOSE IN URINE). Acidulate a little urine with acetic acid, mix with one-sixth its volume sat. solut. NaCl, then boil and filter. Albumin and globulin are pptd.; if the filtrate on cooling gives a ppt. on adding more brine, then albumose is present.

Udransky (BILIARY ACIDS). Mix 1 Cc. aqueous or alcoholic solut. with 1 drop 0.1-% aqueous furfurol solut., and overlay on 1 Cc. conc. H_2SO_4—if biliary acids present a violet-red zone forms.

Udransky (TYROSIN). To 1 Cc. of dissolved substance add 1 drop 0.5-% solut. furfurol, and overlay on 1 Cc. conc. H_2SO_4—a pink zone forms.

Udransky (UREA). To conc. solut. of substance add benzoyl chloride and an excess of NaOH—benzoyl-urea forms and ppts.

Udransky-Baumann (GLYCERIN AND CARBOHYDRATES). Tests depends upon *Baumann's* reaction with benzoyl chloride and NaOH. Diamines also give this reaction, hence the presence of the first-mentioned compounds must be confirmed by means of the furfurol reaction. See *Molisch's* reaction.

Uffelmann (FREE HYDROCHLORIC ACID IN GASTRIC JUICE). Test-paper prepared from an amylic-alcohol extract of huckleberries is changed in color from a grayish-blue to a pink by HCl in gastric juice.

Uffelmann (FREE ACIDS IN GASTRIC JUICE). 1.—1 drop solut. Fe_2Cl_6, 0.4 Gm. alcohol, and 100 Gm. water. 2.—3 drops

solut. Fe_2Cl_6, 3 drops conc. solut. carbolic acid, and 20 Cc. water. HCl decolorizes this reagent, lactic acid colors it yellow, and butyric acid causes a milky turbidity.

Uffelmann (LACTIC ACID). Phenol solut., colored by ferric chloride, is colored yellow by lactic acid. Butyric acid gives a similar reaction.

Uffelmann (NITRIC ACID). On adding 3 or 4 drops of liquid to be tested to 1.5 Cc. H_2SO_4 colored pale-pink by a small fragment diphenylamine, a blue color develops.

Ultzmann (BILIARY PIGMENTS). Shake 10 Cc. urine with 3 to 4 Cc. KOH solut. (1:3) and treat with excess pure HCl—if biliary pigments present, the mixture acquires a beautiful emerald-green color.

Ultzmann-Hoffmann (BILIFUSCIN). See *Hoffmann-Ultzmann.*

Umikoff (WOMAN'S MILK). Mix 5 Cc. milk with 2.5 Cc. 10-% NH_3, and heat 15 or 20 minutes on water-bath at 60° C. If milk is that of a woman it acquires a violet-red color, the more intense the longer the period since the beginning of lactation. The milk of cows or other graminivorous animals, under similar treatment, acquires a yellowish or at most yellowish-brown color.

Underwood (GOLD STAINING PROCESS). Wash sections of decalcified teeth in $NaHCO_3$ solut., then treat for half to one hour with 1-% neutral solut. gold chloride, wash in water, and reduce in 1-% formic acid, kept fairly hot on a water-bath in the dark. They will turn crimson in about an hour, and should then be washed for half an hour in cold water and mounted in glycerin jelly.

Unna (BLEACHING CHROMIC OBJECTS). The brownish-green color is removed by treating with H_2O_2.

Unna (HEMATOXYLIN STAIN). "Over-ripening" of hematoxylin stains, brought about by excessive oxidation, is prevented by adding a reducing agent, like sulphur. Dissolve 1 part hematoxylin in 100 parts alcohol, and add to a solut. of 10 parts alum in 200 parts water. In 2 or 3 days, when the solut. has become somewhat strongly blue, add 2 parts sublimed sulphur. This fixes the stage of oxidation attained by the solut., and the latter may be used at once for staining. It does not give so energetic a stain as a solut. totally and instantaneously

ripened with H_2O_2, and does not keep so well as a solut. containing glycerin. See *Mayer's* glychemalum.

Unna (LEPRA-BACILLUS DOUBLE STAIN: DRY METHOD). Stain in aniline-water fuchsine 12 to 24 hours. Differentiate in 10- to 20-% aqueous solut. HNO_3 till section is yellowish, then place in dil. alcohol several seconds till red color returns, wash out acid with prolonged rinsing in dist. water or by dipping once in weak NH_3. Remove excess of water from object-glass with blotting-paper or by careful heating over flame 1 or 2 minutes till section absolutely dry, and immediately mount in chloroform balsam.

Unna (STAIN FOR SMOOTH MUSCLE). Stain sections for 10 minutes in polychromatic methylene-blue solut., rinse in water, and place for 10 minutes in 1-% solut. potassium ferricyanide, which fixes the color. Next differentiate with alcohol containing 1% HCl, and after the collagen ground comes out white (about 10 minutes), pass the sections into absolute alcohol prior to clearing and mounting in balsam.

Unverdorben-Franchimont (RESINS AND TERPENES). Reagent is a conc. aqueous solut. copper acetate. Sections of tissue exposed for several days to the action of the solut. have their resinous portions colored emerald green.

Upson (GOLD AND IRON METHOD). Material hardened in the dark in potassium-bichromate solut. (1-%, gradually increased to 2- or 2.5-%) for 4 to 6 months is washed with water, treated for 2 or 3 days with 50-% alcohol, which is changed as often as necessary, and then left in 95-% until they show a decidedly green color (2 to 4 weeks), the alcohol being changed as often as precipitates occur. Cut sections under water or by the celloidin process, and in the former case place them in alcohol immediately and leave them there for 2 to 3 days. Next immerse for 1 to 2 hours in a 1-% solut. gold chloride acidulated with 2-% HCl, rinse in water, and treat for half a minute with a solut. of about 0.2 Gm. potassium ferrocyanide in 5 Cc. 10-% solut. KOH. Then wash for half a minute more in simple KOH solut., and afterward for some time in distilled water. The reducing solution is freshly prepared when required by mixing 5 Cc. sulphurous acid and 10 to 15 drops 3-% tincture iodine, and adding 1 drop solut. Fe_2Cl_6. A section is

placed on a piece filter-paper in a watch-glass, the reducing mixture quickly poured over it, and as soon as a rose-red color appears the section is removed into distilled water. After changing the water once, place the section on a slide and immerse in absolute alcohol for 5 to 15 minutes, then clear with clove oil and mount in balsam. As the treatment with potassium ferrocyanide may cause the formation of Prussian-blue in the tissue subsequently, it is sometimes omitted. The sections must be kept in the dark.

Upson (GOLD AND VANADIUM METHOD). Sections prepared as for Upson's gold and iron method are placed for 2 hours in a mixture of 5 Cc. of 1-% gold-chloride solut., 10 drops sat. solut. ammonium vanadate, and 3 drops HCl. Then wash with dist. water, and place for half a minute or so in a mixture of 5 Cc. 10-% KOH solut., 10 drops 10-% potassium-permanganate solut., and a trace ammonium vanadate. Next rinse in dist. water, and treat until they become red with the reducing fluid. This is prepared by mixing 15 drops 3-% tincture iodine to which tin chloride has been added until it becomes white or yellowish, 3 Cc. dist. water, and 3 to 5 drops sat. aqueous solut. iron phosphate. At the moment of using add 3 Cc. sulphurous acid, pour the mixture over the section as in Upson's gold and iron method, and finish in accordance with that method.

Uschinsky (CULTURE SOLUTION FOR BACTERIA). Glycerin, 30 to 40 Gm.; NaCl, 5 to 7 Gm.; $CaCl_2$, 0.1 Gm.; $MgSO_4$, 0.2 to 0.4 Gm.; potassium phosphate, 2 to 2.5 Gm.; ammonium lactate, 6 to 7 Gm.; sodium asparaginate, 3 to 4 Gm.

Uslar-Erdmann (ALKALOIDS). See *Erdmann-Uslar.*

Valenta (FATS). Intimately mix equal volumes fat and glacial acetic acid (sp. gr. 1.0562) in a test-tube, and if no solution takes place, heat. Three classes of oils are distinguished, according as solution results at ordinary temperatures, at temperatures up to the boiling-point of glacial acetic acid, or whether even then, solution is incomplete. With oils dissolving on heating, the temperature is observed at which, upon cooling, turbidity first appears. According to *Bach*, the same observations made with *David's* alcoholic acetic acid (q.v.) and the free fatty acids separated from the fats, give good results.

Valentin (FUCHSINE TEST). Upon shaking ether with a solut. containing fuchsine, the latter is not dissolved by the ether; upon adding ferrous iodide, however, the ether is colored violet.

Valzer (ALKALOIDS). Modification of *Mayer's* test. KI, 49.8 Gm.; water, 1 liter. Shake solut. with excess of HgI_2 and filter.

Van Beneden (SUBLIMATE SOLUTION). Sat. solut. of $HgCl_2$ in 25-% acetic acid.

Van Beneden-Neyt (ACETIC ALCOHOL). Equal volumes glacial acetic acid and absolute alcohol.

Van Deen (BLOOD). A blue color results on adding to a highly dil. solut. containing blood a few drops freshly prepared tincture guaiac and a little ozonized turpentine oil.

Van de Vyvere-Franqui (GLUCOSE). See *Franqui-Van de Vyvere.*

Van der Velden (HYDROCHLORIC ACID IN GASTRIC JUICE). See *Maly's* test; also *Schuchard's* test.

Van Ermengen (STAINING FLAGELLA). Treat cover-glass preparations for 5 to 30 minutes with a mordant composed of 1 part 2-% solut. osmic acid, 2 parts 10- to 25-% tannin solut., and 4 or 5 drops acetic acid to every 100 Cc. mixture. Then wash in water and alcohol, place in a solut. of $AgNO_3$, and transfer for a few seconds to a solut. of gallic acid, 5 Gm.; tannin, 3 Gm.; sodium acetate, 10 Gm.; and dist. water, 330 Gm. After again placing in the $AgNO_3$ solution, wash, and mount in balsam.

Van Ermengen (STAINING CILIA OF BACTERIA). See *Ermengen, Van-.*

Van Gieson (FORMALDEHYDE FOR HARDENING BRAIN). Solutions of formaldehyde, of 4-, 6-, and 10-% are used and followed by 95-% alcohol.

Van Heurck (MOUNTING MEDIUM). This is naphtalin monobromide, which has a refractive index of 1.658.

Van Walsem (PARAFFIN MASS). For imbedding large objects, add to the paraffin 5% yellow wax.

Vaudin (MILK). Introduce 5 drops 1:1,000 solut. indigo-carmine into a 100-Cc. flask, fill with milk, seal with a cork dipped in paraffin, and set aside. Fresh milk will not discharge the

color for many hours; stale milk becomes discolored in proportion to the time it has been kept.

Vaughan-Novy (TYROTOXICON). Place 2 or 3 drops each of H_2SO_4 and phenol on a porcelain surface, and add a few drops of aqueous solut. of ethereal residue of substance—a yellow to orange-red color develops if tyrotoxicon present. Test is only a preliminary one, and should always be followed by the physiologic test.

Velden (HYDROCHLORIC ACID IN GASTRIC JUICE). See *Suchard's* reagent.

Ventre-Pacha (SUGAR). To 10 Cc. of the saccharine liquid, filtered and clarified if necessary, add 12 drops of pure H_2SO_4, then 5 drops solut. of equal parts of nitrobenzene and alcohol, and finally 20 drops of a sat. solut. ammonium molybdate. Then boil for three minutes, when there develops a blue color, which is the more intense the greater the quantity of sugar present. This color is compared with that afforded by a sugar solution of known strength. This test is stated to afford a very intense color with a 1:1,000 sugar solut.; the best results are obtained with solutions of 1:10,000. An appreciable reaction is also obtained with a 1:100,000 solut., and even with one as dilute as 1:1,000,000.

Verven (ALKALOIDS). See *Marmé's* reagent.

Verworn (NARCOTIZATION). On placing Cristatella for a few minutes in 10-% solut. chloral hydrate, they are killed and sooner or later become extended.

Vetere, Di- (CASTOR-OIL). See *Di-Vetere*.

Viallanes (CELLOIDIN IMBEDDING). Celloidin is hardened by immersing imbedded mass in chloroform for a few hours.

Viallanes (GOLD METHOD). Tissues are treated with 1-% osmic acid until they begin to turn brown, then with 25-% formic acid for 10 minutes. Next place in gold-chloride solut. (1:5,000 or weaker) for 24 hours, in the dark, and afterward reduce in the light with 25-% formic acid.

Vidan (SUGAR). A pink color develops on heating to boiling point equal volumes sesame oil and HCl, and adding suspected liquid.

Vignal-Ranvier (OSMIUM MIXTURE). Fixing solution is a mixture of equal volumes 1-% osmic acid and 90-% alcohol.

Objects are afterward washed out in 80-% alcohol, then washed with water, and stained for 48 hours in picro-carmine or hematoxylin. This method has been applied by *Viallanes* to the histology of insects.

Vignal-Ranvier (PICRO-CARMINE). See *Ranvier.*

Villavecchia-Fabri (SESAME OIL). This modified *Baudouin's* test is prepared by dissolving 2 Gm. furfurol in 100 Cc. alcohol. On shaking 10 Cc. suspected oil for half a minute with 0.1 Cc. furfurol solut. and 10 Cc. HCl (sp. gr. 1.19) a red color develops if sesame oil present.

Ville (CARMINE INJECTION MASS). Mass is prepared exactly like *Ranvier's*, except that it is more carefully neutralized, dichroic litmus paper being employed as an indicator.

Villiers-Fayolle (ALDEHYDES AND KETONES). Reagent is prepared by adding just enough H_2SO_3 to a solut. of magenta to decolorize it on long standing.

Villiers-Fayolle (HYDROBROMIC ACID). Add to liquid (free from HNO_3) an excess of Fe_2Cl_6 solut. free from free chlorine. Iodine, if present, separates out and crystallizes, and is volatilized on evaporating mixture to dryness and further heating on water-bath. HBr remains unaffected. Add a little water to residue, ppt. Fe with an alkali, add excess of HCl to filtrate, then add chlorine water drop by drop, shaking the liquid with CS_2—latter is immediately colored yellow by liberated Br.

Villiers-Fayolle (HYDROCHLORIC ACID AND CHLORINE). Even traces of chlorine in acid aniline solution (400 Cc. sat. aqueous aniline solut., and 100 Cc. glacial acetic acid) yield brownish to black ppts.; aniline solut. containing ortho-toluidine (100 Cc. sat. aqueous aniline solut., 200 Cc. sat. aqueous ortho-toluidine solut., and 30 Cc. glacial acetic acid), yield a blue color, changed to reddish-violet on applying heat or cold. Br and I give no color reactions with above mixtures, although Br yields a white ppt. To apply this test to the halogen hydracids, the halogens are liberated from their combinations by heating with dil. H_2SO_4 and $KMnO_4$.

Villiers-Fayolle (SUGARS, ALDEHYDES, AND KETONES). Reagent is a solut. rosaniline decolorized by sulphurous acid. The solut. again becomes red on adding aldehydes, grape sugar, invert sugar, galactose, and reducing dextrins, but remains

colorless with ketones, levulin, and sorbin. Cane sugar maltose and lactose give at first no color, but in a few days the red color develops and increases in intensity.

Vincent (DIFFERENTIATING ALPHA-NAPHTOL FROM BETA-NAPHTOL). Iodic acid gives with alpha-naphtol a flocculent, whitish-yellow ppt., rapidly becoming violet; with beta-naphtol the ppt. gradually becomes red, and after a time the liquid has a reddish color, while the ppt. is reddish-brown.

Violette (GLUCOSE). Identical with *Fehling's* solution (q. v.).

Virchow (CHROMIC OBJECTS). Ppt. formed on the surface of preparations treated with chromic acid or a chromate and placed in alcohol for hardening or preservation, is entirely prevented by keeping preparations in the dark. The alcohol should be changed as it becomes yellow.

Vitali (ALKALOIDS). Color reactions are afforded: 1.—On evaporating to dryness with fuming HNO_3, and adding 1 drop alcoholic KOH solut. 2.—On treating with H_2SO_4, with or without $KClO_3$, and adding an alkaline sulphide. *Atropine* causes a violet color, changing to a fine red, when treated by the first method. *Morphine* dissolved in H_2SO_4, and treated cautiously after adding 2 drops of Na_2S solut. produces a flesh color, changing to violet and then to dark-green.

Vitali (BILIARY PIGMENTS). A violet color develops on adding to the urine a solut. quinine bisulphate, neutralizing with NH_3, taking up with H_2SO_4, and adding a crystal of sugar with a little alcohol. See *Gmelin's* reaction.

Vitali (BLOOD). Extract suspected stain with KOH solut., acidulate solut. with acetic acid, and add tincture guaiac. If no blue color appears within 2 hours, addition of turpentine or eucalyptus oil will immediately develop color if blood present.

Vitali (CHLORATES). If a drop of aqueous aniline-sulphate solut. be mixed with a few drops conc. H_2SO_4 and added to a solut. of a chlorate, a deep-blue color results, intensified on diluting with a few drops water. Reaction is not given by nitrates.

Vitali (CHLOROFORM). Pass a current of hydrogen through water and ignite as it escapes through a jet tipped with platinum. 1.—The colorless flame becomes blue or green when a fine copper wire is introduced into it, if a liquid containing

chloroform or any other volatile chlorine compound be poured into the water. 2.—A red color is produced on passing the gas as above into a mixture of thymol and KOH solut.

Vitali (DIFFERENTIATING ATROPINE FROM STRYCHNINE). 1.—*Atropine* oxidized with HNO_3 (particularly immediately after evaporating the acid) develops a pleasant odor (like hawthorn); strychnine does not. 2.—*Strychnine* turns yellow during oxidation, and, after HNO_3 is evaporated, residue also is yellow; *atropine* gives no yellow color or yellow residue. 3.—Add alcoholic KOH, and evaporate alcohol—*atropine* gives a violet residue, becoming deeper on adding more KOH; *strychnine* gives a yellow or reddish-yellow residue, becoming reddish-violet on adding KOH. 4.—Add water after adding alcoholic KOH—with *atropine* the color will disappear; with *strychnine* it becomes yellow. 5.—Oxidize *atropine* with HNO_3, evaporate acid, and treat residue with NH_3—little drops appear which give a violet color with alcoholic KOH; with *strychnine* the NH_3 gives a reddish-orange color, and the KOH a violet one.

Vitali (DIFFERENTIATING CHLORINE, BROMINE, AND IODINE DERIVATIVES). 1.—On adding a few drops solut. of a bromine salt to a solut. of manganous sulphate acidulated with H_2SO_4, a violet color develops (chlorine and iodine give none). 2.—Hydroxylamine sulphate reduces iodides in the cold, and bromides with heat, but chlorides not at all, hot or cold. 3.—Phenylhydrazine sulphate acts like hydroxylamine sulphate, but the liberated iodine acts on the phenylhydrazine and forms a red ppt. KBr affords a reddish-brown ppt. on heating. Chlorides give no ppt. hot or cold. 4.—Hypophosphorous acid reduces iodides in the cold, bromides on warming, and chlorides not at all, hot or cold.

Vitali (FUSEL OIL). Red to green colors are produced on overlaying a liquid containing fusel oil on H_2SO_4.

Vitali (MARTIUS' YELLOW [NAPHTOL-YELLOW; BUTTER-YELLOW] IN URINE). 1.—Evaporate ethereal extract of suspected liquid; the residue is colored red upon treatment with KCN solution if Martius' yellow present. If the ethereal solution is shaken with KOH solut., and the latter then acidulated, woollen fibers mordanted with alum will be tinged yellow when

dipped into the acidulated solution, even when only 0.000001 Gm. naphtol-yellow present. 2.—A solut. of naphtol-yellow (even in urine) gives a green lake with cobalt chloride and KOH. 3.—The same solution, with $SnCl_2$ and subsequently with NH_3 yields a white ppt., which becomes rose-red on adding more NH_3.

Vitali (QUININE IN URINE). Make alkaline a fairly large quantity of urine, and shake out with ether. Add a few drops HCl to ethereal extract, and evaporate, dissolve residue in water, treat solution once more with NH_3 and ether, and, after evaporating latter, dissolve residue in an acid, and add chlorine water and NH_3—an intense emerald-green color develops.

Vitali (THYMOL). A red color develops on distilling and passing the vapors into a mixture of chloroform and KOH solut.

Vitali-Arnold (ALKALOIDS). See *Arnold-Vitali.*

Vitali-Stroppa (CONIINE). 1.—Add a few drops of a 1:200 solut. potassium permanganate in conc. H_2SO_4 to coniine or one of its salts, and stir with a glass rod—the green color of the solut. changes to violet. 2.—Carefully evaporate minute quantity of coniine with a few drops conc. HNO_3—a dark-yellow residue remains, and which, treated with a few drops KOH solut. yields a reddish-brown oil of characteristic hemlock odor. The oil, evaporated to dryness, gives a brownish-black residue, yielding with conc. H_2SO_4 an almost colorless solut., changed to yellow by water and excess of NH_3.

Vogel (ALCOHOL). A blue color develops on shaking chloroform containing alcohol with KOH, and applying to a piece of moistened red litmus paper.

Vogel (CARBON DISULPHIDE). A lemon-yellow ppt. forms on adding to a liquid containing carbon disulphide an alcoholic solut. KOH, followed by a solut. $CuSO_4$.

Vogel (CHENOPODIUM SEED IN FLOUR). Chenopodium seed is indicated by a rose-red color on digesting the flour for a few hours with alcoholic HCl.

Vogel (FERRIC SALTS). A violet color is produced with salicylic acid in slightly acid solut.

Vogel (FLOUR). Mixture of alcohol (70-%), 95, and HCl, 5. Heat a small sample of the flour to boiling in the test-tube with the reagent after shaking, and allow to subside. If the flour be

pure, the fluid is colorless; *gruffs*, with *bran*, are indicated by a straw-colored tint. *Corn-cockle* flour is betrayed by an orange-yellow; *vetches* by a pink; *ergot* by a flesh color; *buckwheat* by a green color.

Vogel (GLUCOSE). A modified *Mulder's* test (q. v.), in which litmus is used instead of indigo.

Vogel (NARCEINE). A blood-red color develops on adding chlorine water and a few drops NH_3, and does not disappear on adding excess of NH_3.

Vogel (NITRIC ACID). Nitric acid in water is indicated by a red-violet color on boiling 15 Cc. water with a little gold leaf and a few drops pure HCl, then filtering and adding $SnCl_2$.

Vogel (QUININE). 1.—A pink or red color develops on treating with chlorine water and adding potassium ferrocyanide in fine powder. 2.—If potassium ferrocyanide and bromine water be added to a quinine solution until a faint yellow tint results and dil. NH_3 be then added, a red color develops. *Blaise* states that the potassium ferrocyanide is not essential to this reaction, tending only to render the color more permanent. If strong NH_3 be added to the red solut., the color changes to green. If half-saturated bromine water be added to 0.25-% solut. quinine until the commencement of a yellow reaction, and if 1- to 2-% NH_3 be dropped in after half a minute, a red color is obtained which changes to green on adding conc. NH_3.

Vogel (SULPHURIC ACID). Chlorine is evolved on adding $KClO_3$ to vinegar containing H_2SO_4.

Vogel (TANNIN). Chlorine water and a few drops NH_3 cause a blood-red color.

Vogel (TURPENTINE OIL). The color of an essential oil containing turpentine is altered on mixing 5 drops with 1 drop of H_2SO_4.

Vohl (SULPHUR). A black color develops on heating substance with the clear liquid decanted from a mixture of glycerin and water (2 : 1), saturated with slaked lime and freshly-prepared lead hydroxide.

Volhard (SILVER CHLORIDES, IODIDES, BROMIDES). This method of determination requires four solutions. 1.—Decinormal ammonic thiocyanate, made by dissolving about 8 Gm. ammonium thiocyanate per liter, and adjusting to decinormal

strength with decinormal silver nitrate. 2.—Decinormal silver solut. 3.—Sat. solut. of iron alum. 4.—Pure nitric acid. To standardize the thiocyanate solution, place 50 Cc. decinormal silver solut. in a flask, add 5 Cc. ferric indicator, and 10 Cc. nitric acid. The thiocyanate is then run in until a faint brown color develops; this should require 50 Cc. To determine chlorides, the difference between the amounts of silver and thiocyanate solutions added indicates the silver used up by the salts.

Vom Rath (PICRO-OSMIC ACID). 200 Cc. sat. aqueous solut. picric acid, 12 Cc. 2-% osmic acid solut., and 2 Cc. glacial acetic acid.

Vom Rath (PICRO-PLATINIC MIXTURE). 200 Cc. sat. aqueous solut. picric acid, 1 Gm. platinic chloride dissolved in 10 Cc. water, and 2 Cc. glacial acetic acid.

Vom Rath (PICRO-PLATIN-OSMIC MIXTURE). Add 25 Cc. 2-% osmic-acid solut. to the picro-platinic mixture.

Vom Rath (PICRO-SUBLIMATE MIXTURE). 1 part cold sat. solut. picric acid, 1 part hot sat. sublimate solut., and 0.5 to 1% glacial acetic acid. Objects are fixed in this for several hours and then brought direct into alcohol.

Vom Rath (PICRO-SUBLIMATE-OSMIC MIXTURE). Add 10% of 2-% osmic-acid solut. to the picro-sublimate mixture.

Von Duyck (INDICATOR). Perezol; Pipitzahoic Acid. Gives with alkalies a pink to mauve rose, rendered colorless by acids.

Von Ebner (DECALCIFICATION MIXTURES). 1.—Mix 100 Cc. cold sat. aqueous solut. NaCl, 100 Cc. water, and 4 Cc. HCl. Preparations are placed in this, and 1 or 2 Cc. HCl added daily until they are soft. 2.—Mix 2.5 parts HCl, 500 alcohol, 100 water, and 2.5 NaCl.

Von Koch (COPAL IMBEDDING METHOD). This is a valuable method for the study of corals and other objects in which hard and soft parts are intimately combined. Small pieces of tissue are stained in bulk and dehydrated with alcohol, then immersed in a thin solut. of copal in chloroform, prepared by triturating small fragments of copal with fine sand, adding chloroform, and subsequently filtering. The capsule containing the objects and the copal solut. is gently heated on a tile by means of a night-light placed beneath it, and as soon as the

solut. is so far concentrated as to draw out into brittle threads on cooling, the objects are removed from the capsule and left to dry for a few days on the tile. When they have attained such a degree of hardness that they cannot be indented by a finger-nail, sections are cut from them by means of a fine saw. These are then rubbed down even and smooth on one side with a hone, and cemented with the smooth sides downward on slides, Canada balsam or copal solut. being employed for the purpose. Leave the slides for a few days on the warmed tile, and, as soon as the cement is perfectly hard, rub down the sections on a grindstone, then on a hone, to the requisite thinness, and polish. Finally, wash with water and mount in balsam. A variation of this plan is to imbed the objects unstained, remove the copal from the sections by soaking in chloroform, decalcify if necessary, and then stain. Or, after removing the copal, a section may be cemented to a slide by means of hard Canada balsam, the exposed half of the specimen being then cautiously decalcified and stained.

Von Marchi (NERVE STAIN). Harden the nerves for a week in Muller's solut., then place for a few days in a mixture of 2 parts Muller's solut. and 1 part of 1-% osmic-acid solut. This method gives positive images of the degenerated elements, whereas that of Weigert gives negative ones only.

Von Müller (INDICATOR). 1.—Tropaeolin OO. Gives with alkalies a yellow color; with acids a yellowish-red to red. 2.—Tropaeolin OOO No. 2. Gives with alkalies a red color, and with acids a yellow.

Von Wistinghausen (BLUING SECTIONS). For neutralizing or bluing hematoxylin-stained tissues, add 3 to 5 drops sat. solut. $NaHCO_3$ in 70-% alcohol to a watch-glass filled with 70-% alcohol, in which the tissues are soaking. See *Squire's* method.

Vortmann (HYDROCYANIC ACID). Add first a few drops solut. potassium nitrite, then 2 to 4 drops solut. Fe_2Cl_6, then dil. H_2SO_4 until light-yellow color, heat to boiling, allow to cool, add NH_3, filter, and to filtrate add ammonium sulphide—a bluish-green to violet-red color develops if HCN present.

Vosseler (VENICE-TURPENTINE MOUNTING MEDIUM). Mix commercial Venice turpentine with an equal volume of 96-%

alcohol in a tall cylinder glass, allow to stand in a warm place 3 or 4 weeks, and then decant. Microscopic preparations may be mounted in this medium without previous clearing with essentials oils, etc., and as its refractive index is below that of Canada balsam or dammer, delicate details are more distinctly brought out. Stains keep well in the medium. See also *Suchannek's* formula.

Vosseler (WAX FEET). To complete dissociation of macerated tissue the plan is sometimes adopted of placing the tissue on a slide, covering it with a thin glass-cover supported on four little feet made of pellets of soft wax, and tapping the cover with a needle so as to press it down gradually and segregate the cells of the tissue by the repeated shocks. When the segregation has proceeded far enough, mounting medium is added and the mount closed. Vosseler obtained a good material for making the wax feet by melting white wax and stirring into it one-half to two-thirds its bulk Venice turpentine.

Vreven (DIFFERENTIATING CREOSOTE FROM GUAIACOL). Mix 1 drop liquid, 2 to 3 drops ether, and 1 to 2 drops conc. HNO_3, add 2 drops HCl, and shake in a test-tube. The mixture, especially the ethereal layer, becomes reddish-brown. Let ether evaporate spontaneously—if guaiacol present acicular crystals soon deposit; in the case of creosote, only minute oily drops form. Carbolic acid also yields crystals, but these can be readily distinguished from those obtained from guaiacol.

Vreven (TROPINE). With a solut. of potassium-cadmium iodide, tropine in slightly acid solut. gives a ppt. of well-defined hexagonal tablets, very soluble in water (hence a conc. slightly acid solution must be employed), and melting at 200° C. With phosphomolybdic acid tropine in slightly acid solut. gives a yellowish ppt. forming crystalline needles.

Vrij, De (ALKALOIDS). Reagent is phosphomolybdic acid. See *Sonnenschein's* reagent.

Vrij, De (QUININE). See De Vrij.

Vulpius (ACETANILID). Boil a few centigrammes acetanilid with ½ Cc. potassa lye, and suspend a drop filtered chlorinated-lime solut. on a glass rod over the hot mixture. The drop is soon colored yellow (with a violet tinge by reflected light); upon continued heating it turns violet.

Vulpius (SULFONAL). Upon heating sulfonal with KCN the odor of mercaptan develops. The fused mass yields a red color when treated with Fe_2Cl_6 (sulphocyanate reaction).

Waage (BOMBAY MACE). 3- to 5-% solut. potassium bichromate colors secretion of mace reddish-brown. The alcoholic mace extract may either be examined, or microscopical sections may be warmed with reagent and the colorations produced examined. In yellow Bombay mace green bodies are observed as well as brown.

Wachhausen (IODINE). Paraldehyde liberates iodine from its combinations with K, Na, and Fe much more completely, although more slowly, than other reagents (as Cl, Fe_2Cl_6, $KMnO_4$, etc.). The I may be recognized by starch paste.

Waddington (ARABIN FOR SERIAL SECTIONS). Prepare a purified gum arabic for serial section mounting by dissolving gum in distilled water, filtering, pouring filtrate into alcohol, and washing the white pasty mass with alcohol until washings are free from water. The white powder obtained on drying dissolve in distilled water and filter twice. Slides coated with this solut. are drained and dried, and may then be preserved ready for use indefinitely.

Wade (BORIC ACID). Boil 0.1 Gm. substance with 0.5 Cc. HCl and 10 Cc. methyl alcohol, and continue boiling until liquid evaporated to small volume (in a test-tube), while a moistened piece of turmeric paper is held to the mouth of the tube in contact with vapors—if boric acid present the characteristic red color develops on paper.

Wagner (ALKALOIDS). A solut. of I and KI (decinormal I solut.) throws down brown ppt. with aqueous solut. of alkaloidal salts.

Wagner (EOSINE). The color is discharged by collodion.

Wagner-Fresenius (SOLUTION). Solut. of I in KI solut.

Waldeyer (DECALCIFICATION OF BONE). To 0.1-% solut. of palladium chloride add one-tenth its volume HCl.

Wallach (SESQUITERPENE). Dissolve ethereal oil to be examined, or a fraction of it, in a large volume glacial acetic acid, and gradually add a little conc. H_2SO_4; a green, then a beautiful indigo-blue, color develops, which is considered to indicate presence of a sesquiterpene.

Waller-Huebl (IODINE SOLUTION). See *Huebl-Waller*.

Walz (FIXED OILS IN ESSENTIAL OILS). Color reactions are produced on adding a syrupy solut. $SbCl_3$.

Wangerin (APOMORPHINE AND MORPHINE). A solut. of 0.3 Gm. each of uranium acetate and sodium acetate in 100 Cc. water gives with a morphine solution a hyacinth-red to orange-yellow reaction, but with apomorphine solutions it gives a brown ppt. which is dissolved by dilute acids, yielding a colorless solut., but which is again thrown down in the colorless liquid on adding an alkali. As the toxins and most other alkaloids do not react like morphine and apomorphine, this test may serve for identifying these two alkaloids.

Wanklyn (ALKALINE PERMANGANATE SOLUTION). KOH 200 Gm., $KMnO_4$ 8 Gm., and dist. water 1,000 Cc. Boil off about 250 Cc., then make up to 1 liter with ammonia-free water.

Wanklyn (AMMONIUM-CHLORIDE SOLUTIONS). For the stronger solut. dissolve 3.15 Gm. NH_4Cl in 1,000 Cc. dist. water; 1 Cc. equals 0.01 Gm. NH_3 For the weaker solution mix 10 Cc. stronger solut. with 990 Cc. water; 1 Cc. equals 0.001 Gm. NH_3.

Wanklyn (STANDARD SOAP SOLUTION). Dissolve 10 Gm. of Castile soap (containing 60% oleic acid) in 1 liter methylated alcohol (35-%). Standardized against solut. of 1.11 Gm. pure fused $CaCl_2$ in 1,000 Cc. dist. water.

Wanklyn (STANDARD SILVER-NITRATE SOLUTION). Dissolve 4.79 Gm. $AgNO_3$ in 1,000 Cc. dist. water; 1 Cc. equals 0.001 Gm. Cl.

Warburg (EHRLICH-BIONDI MIXTURE). Ehrlich-Biondi mixture is acidified by diluting 2 Cc. mixture with 40 Cc. dist. water and adding 3 Cc. 0.5-% solut. acid fuchsine and 0.2 Cc. 0.2-% acetic acid.

Warington (CITRIC ACID IN LIME AND LEMON JUICE). Exactly neutralize 15 to 20 Cc. juice, or 3 or 4 Cc. of conc. juice, with normal NaOH and make up to 50 Cc., then heat to boiling and add a slight excess of $CaCl_2$ solut. The mixture is boiled for 30 minutes, the ppt. collected and washed with hot water, filtrate and washings conc'd to about 15 Cc. and a drop NH_3 added, the ppt. collected on a small filter and washed with boiling water. Both filters with their ppts. are dried, ignited at a low red heat, and the ash titrated with decinormal acid, each Cc. of which equals 0.007 Gm. citric acid.

Warren (GLUCOSE). Like *Trommer's* test (q. v.).

Wartha (ANTHRAQUINONE). A green to bluish-purple develops on heating anthraquinone with KOH and a little alcohol.

Wartha (SULPHUR IN ILLUMINATING GAS). A red color develops on adding a drop sodium-nitroprusside solut. to a soda bead that has been passed along the outer part of the gas-flame, then held for a minute in the luminous part of the flame and crushed.

Wassilieff-Bogomolow (ALBUMIN AND PEPTONES). See *Bogomolow-Wassilicff.*

Wasilewsky (BELLADONNA IN MIXTURES). Extract with very dil. HCl, evaporate to syrupy consistency, mix with alcohol, filter, evaporate off the alcohol, shake out with ether, amylic alcohol, benzene, or petroleum ether, make alkaline with NH_3, and shake out with chloroform. The residue left on evaporating the chloroform may then be purified, and the atropine tests applied.

Watson (GALLIC ACID). A red color develops on adding NH_3 and HCl to an aqueous solut. gallic acid.

Watson (PYROGALLIC ACID). A lemon-yellow color develops on adding NH_3 to an aqueous solut. pyrogallic acid.

Watson (TANNIN). A purple color develops on adding NH_3 and HNO_3 to an aqueous solut. tannin.

Wayne (GLUCOSE). Dissolve 2 Gm. of $CuSO_4$, 10 Gm. KOH, and 10 Gm. glycerin in 200 Gm. water. Glucose reduces the diluted solut. upon warming, cuprous oxide separating out.

Webb (DEXTRIN FREEZING MASS). A thick solut. dextrin (1:4) in aqueous solut. carbolic acid is used for imbedding, and subsequently frozen.

Weber (BLOOD). A blue color results on treating urine, or other liquid containing blood, with glacial acetic acid, shaking out with ether and adding to the separated ethereal layer old resinified turpentine oil, together with a few drops of freshly prepared 10-% tincture guaiac. Compare *Almén's* test.

Weber (INDICAN). Heat to boiling 30 Cc. urine containing indican with 30 Cc. HCl, then cool and shake with ether—a blue foam will form, whilst the ethereal layer will be colored red. See *MacMunn's* test.

Wedl (ORSEILLE OR ORCHELLA STAIN). Mix 5 Cc. acetic acid, 20 Cc. absolute alcohol, and 40 Cc. dist. water, then add sufficient archil, from which excess of NH_3 has been driven off, to form a dark-reddish fluid.

Weichselbaum (TUBERCLE STAIN). Stain as with Ziehl-Neelsen, then, after rinsing in water, place directly in a conc. alcoholic solut. methylene blue, where cover-glass is allowed to remain until evenly stained blue; then rinse in water.

Weidel (XANTHINE BODIES). Dissolve in warm Cl water, evaporate on water-bath, and treat under bell-jar with NH_3—a dark-pink or purple develops, changed to violet by KOH or NaOH. Reaction afforded by xanthine, heteroxanthine, paraxanthine, and carmine.

Weigert (AMMONIACAL GENTIAN VIOLET). Stronger ammonia, 0.5 Gm.; gentian violet, 2 Gm.; absolute alcohol, 10 Gm.; dist. water, 90 Gm.

Weigert (BACTERIA STAIN). Treat section with a sat. solut. gentian violet or methylene violet in aniline water. If section is stained on object-glass, remove excess of stain with blotting-paper, and drop solut. KI on it. In this case allow stain to remain in contact with section only a very short time. The sections stained in a saucer are afterward washed in a solut. NaCl, placed upon the object-glass, dried, and treated with KI. Afterward dry again with blotting-paper and drop on it aniline several times. Then remove the aniline from the now transparent section with xylene and mount in balsam.

Weigert (BACTERIA STAINS). Dissolve 2 to 4 Gm. methylene blue (or 2 Gm. fuchsine or 2 Gm. victoria blue) in 15 Cc. alcohol, and dilute solut. with 85 Cc. water.

Weigert (CLEARING CELLOIDIN SECTIONS). A mixture of 3 parts xylene with 1 part anhydrous carbolic acid is used. As this mixture discolors basic aniline stains, replace the carbolic acid with xylene when they are employed.

Weigert (CORRECTING PICRO-CARMINE). Soluts. of unsatisfactory picro-carmine are treated with small quantities acetic acid until a slight ppt. remains, even after stirring; then place on one side for 24 hours, filter, and add NH_3, drop by drop, at intervals of 24 hours, until solut. becomes clear. If the solut. stains too yellow add acetic acid; if it overstains red add a little NH_3.

Weigert (FIBRIN STAINS). Stain sections of alcohol material in a sat. solut. gentian- or methyl violet in aniline water, then place on a slide, remove excess of stain by means of blotting-paper, and pour Lugol's solut. on to them. Next remove excess of lugol with blotting-paper and add a drop aniline to differentiate and clear. Change aniline once or twice as it becomes dark, then remove all traces of it by means of xylene, and mount in balsam. In the modification of this stain used as a neuroglia stain, a warm saturated solut. methyl violet in 70- or 80-% alcohol is decanted after cooling and 5% aqueous solut. (? sat.) oxalic acid added. Moreover, the pure aniline is replaced by a mixture of equal parts of aniline and xylene.

Weigert (GRAM'S METHOD). In this modification aniline is substituted for alcohol in order to avoid prolonged washing with the latter, and the process is conducted on a slide. The section is placed on a slide stained with a few drops gentian violet aniline-water prepared as in Gram's method, the excess of fluid removed, and a few drops of Gram's solut. applied. Subsequently remove liquid by gently blotting it off, then wash section by allowing aniline to flow backwards and forwards over it, and when color ceases to come away repeat operation with xylene for about 1 minute, then mount in balsam.

Weigert (HEMATOXYLIN). 1.—Dissolve 1 part of hematoxylin in 10 parts absolute alcohol; then add 90 parts dist. water and 1 part of aqueous solut. (1:70) lithium carbonate. 2.—One Cc. cold sat. solut. lithium carbonate is added to 100 Cc. solut. of 0.75 to 1.0 Gm. hematoxylin in 10 Gm. alcohol and 90 Gm. water. The washing of the stained sections is done with a borax-potassium ferricyanide solut. (borax, 2; potassium ferricyanide, 2.5; water, 100).

Weigert (NEUROGLIA STAIN). Pieces of tissue 0.5 Cm. thick are hardened for 4 days or more in 4-% formaldehyde solut. and then mordanted for 8 days at normal temperature in an aqueous solut. containing 5% neutral copper acetate, 5% acetic acid, and 2.5% chrome alum; prepare solut. by adding the alum to water, raising the solut. to boiling-point, and adding the acid and powdered acetate. Next wash tissues in water,

dehydrate, imbed in celloidin, and cut sections. Treat sections for 10 minutes with a 0.3-% solut. $KMnO_4$, wash well in water, then immerse for 2 to 4 hours in a solut. prepared by dissolving 5% each of "chromogen" and formic acid in water, filtering, and to each 90 Cc. adding 10 Cc. 10-% sodium-sulphite solut. After this bath leave sections for 24 hours in a 5-% solut. of chromogen, then carefully wash, and stain with a modification of Weigert's fibrin stain, which see.

Weigert (STAINING BRAIN TISSUE). Pieces of brain and spinal cord are hardened in bichromate solut., followed by alcohol, then imbedded in celloidin or gum. If imbedded in celloidin, the pieces are subsequently taken from the alcohol and placed for 1 or 2 days in sat. aqueous solut. copper acetate, diluted with an equal bulk water, the mixture being kept at about 40° C. Afterwards transfer pieces to 80-% alcohol until required for cutting. Or, sections can be cut first, and then treated with copper acetate. To stain sections, after being well washed in 90-% alcohol, they are transferred to Weigert's hematoxylin, and left for a few hours to 2 days, according to differentiation required. When opaque and of a deep blue-black color, wash well for 2 or 3 days in distilled water. Next decolorize for 0.5 to 2 hours in a solut. 2 Gm. borax and 2.5 Gm. potassium ferricyanide in 200 Cc. of water. As soon as the gray and white substances are sharply defined, again wash sections in water for half an hour, then dehydrate, clear, and mount in balsam.

Weigert (STAINING IN ACTINOMYCOSIS). Immerse sections for 1 hour in *Wedl's* orseille stain, then quickly rinse with alcohol, and counterstain with gentian violet. If it be desired to stain mycelium also, afterwards submit sections to Weigert's modification of *Gram's* method.

Weigert (VARNISH FOR MOUNTING SECTIONS). Mount large sections in photographic negative varnish without cover-glasses.

Weigert-Koch (ANILINE-FUCHSINE OR METHYLENE-BLUE). Sat. aniline water, 100 Cc.; conc. alcoholic solut. methylene blue (or fuchsine), 11 Cc.; absolute alcohol, 10 Cc. This solut. will keep 10 to 12 days.

Weil (CANADA BALSAM FOR IMBEDDING). Heat Canada balsam till it becomes brittle when cold, then dissolve in chloroform.

Objects to be imbedded (bone or teeth) are heated in this on a water-bath. See J. R. M. S., 1888, 1042.

Weil-Gilbert (INDICAN IN URINE). Add 1 to 2 drops solut. Fe_2Cl_6 and 2 drops chloroform to 5 Cc. each of HCl and urine, and shake mixture—chloroform becomes colored light- or dark-blue, according to quantity of indican present. Instead of Fe_2Cl_6 there may be employed ammonium persulphate.

Weingaertner (BASIC AND ACID COLOR). Tannin, 25 Gm.; sodium acetate, 25 Gm.; water, 250 Gm. Basic colors are pptd. by the reagent, but not acid colors.

Weiske (INDICATOR). Add a few drops Fe_2Cl_6 solut. to an aqueous solut. salicylic acid, then cautiously add dil. NaOH till exactly neutralized. On adding a few Cc. of this yellowish-red solut. to the acid solut. under examination, and neutralizing with NaOH, a deep violet color appears, but vanishes with the slightest excess of alkali.

Weissman (ACID MIXTURE). Solut. for dissolving iron samples consists of 10 vol. conc. HNO_3, 2 vol. conc. H_2SO_4, and 10 vol. water. *Ulzer* and *Brull* also recommend the addition of a little conc. HCl during concentrating.

Wellcome (MORPHINE). Chlorinated lime gives with a morphine solut. a red color.

Weller (TITANIUM). A few drops H_2O_2 added to a solut. titanic acid in H_2SO_4 develops an orange-red to yellow color.

Welmann (VEGETABLE FATS). Dissolve 5 Gm. sodium phosphomolybdate in water, treat with conc. HNO_3, and dilute to 100 Cc. 1 Cc. or 1 Gm. fat is dissolved in 5 Cc. chloroform and shaken for a minute with 2 Cc. reagent. If vegetable fats (cocoanut oil excepted) present, a green color forms, changing to blue upon adding NH_3.

Weltzien (HYDROGEN DIOXIDE). Fe_2Cl_6 and potassium ferricyanide give with H_2O_2 a blue color.

Wemince (OILS). Nitric-oxide gas is passed into a suspension of the oil with water. The nitric oxide is produced from iron turnings and HNO_3. Non-drying oils are solidified in this test. (Compare *Barbot's*, *Behren's*, *Boudet's*, *Cailletet's*, and *Poutet's* tests.)

Wender (ALKALOIDS). Reagent is a solut. of furfurol, 5 drops, in conc. H_2SO_4, 10 Cc. On stirring alkaloid in a porcelain

capsule with 2 to 3 drops of reagent, using a glass rod, various reactions are given, as follows: *Atropine*, *Aconitine*, *Brucine*, and *Colchicine*—brown mixture. *Strychnine*—muddy-brown color becoming dark-green on heating, then muddy-blue and violet on adding a few drops water. *Morphine* and *Codeine*—red-brown, violet-red on heating; with codeine mixture rapidly deodorizes. *Veratrine*—yellow, then olive-green with blue margins, then sap-green, and finally blue; on heating, violet. *Sabadilline* and *Papaverine*—like veratrine, but tints are less pure; brownish, then muddy-violet. *Digitalin*—brown, reddish on heating. *Quinine*—dark brownish-green; on heating, green, then brown; on adding water, margins distinctly green. *Coniine* and *Nicotine*—brown, indistinct and non-characteristic color.

Wender (GLUCOSE). See *Neumann-Wender's* test.

Wender (SUCROL; DULCIN). Treat 1 or 2 crystals with fuming HNO_3 in a porcelain evaporating-dish—a violent reaction takes place, and an orange-yellow substance results. On evaporating to dryness on a water-bath, the residue is varnish-like, orange-yellow, and soluble in alcohol, ether, or chloroform. On adding 2 drops each of carbolic acid and conc. H_2SO_4 to the residue, and stirring with a glass rod, an intense blood-red color develops.

Wender (SUGAR IN URINE). Dilute 5 to 10 Cc. urine with 10 volumes water, and to 1 Cc. of the mixture add 1 Cc. of a 1 : 1,000 aqueous solut. methylene blue and 1 Cc. decinormal KOH, diluted with 2 Cc. water. Boil up several times. If urine contains as little as 0.5% sugar, complete decolorization occurs. If blue color persists, urine cannot be regarded as diabetic.

Wender-Neumann (GLUCOSE). See *Neumann-Wender.*

Wenzel (ALKALOIDS). These yield various colors with a solut. 1 Gm. $KMnO_4$ in 200 Gm. H_2SO_4. Veratrine, for instance, yields first a light-red, then an orange ppt.

Weppen (MORPHINE). Treatment with sugar, H_2SO_4, and Br. affords a red color.

Weppen (VERATRINE). If a small quantity veratrine is mixed with about six volumes cane sugar and then a few drops conc. H_2SO_4, a yellow color develops, changing to green and finally to blue. *Neumann-Wender* employ, instead of H_2SO_4 and cane

sugar, a solut. furfurol in H_2SO_4. Morphine and codeine yield with either reagent unstable red colors.

Werber (NITRO-GLYCERIN). Extract with ether or chloroform, add 2 drops aniline, evaporate, then add a few drops H_2SO_4— a purple to dark-green color appears.

Werner (AMYLIC ALCOHOL IN CHLOROFORM). On treatment with potassium bichromate and H_2SO_4 valerianic acid forms.

Werner-Schmidt (FAT IN MILK). Add to milk an equal volume HCl (sp. gr. 1.1), heat on water-bath till nearly black, then cool, and extract with ether. On evaporating this the fat remains and may be weighed.

Werther (META-VANADATES). An acidulated solut. of a meta-vanadate shaken with H_2O_2 gives a red color; if highly diluted a brownish rose-red color results; when shaken with ether the color remains unchanged and the ether colorless.

Weselsky (INDICATOR). Resazurin. Gives a blue color with alkalies, and a red with acids. Also known as Crismer's indicator.

Weselsky (PHLOROGLUCIN). Upon adding toluidine nitrate and KNO_3 to a phloroglucin solut., a light-yellow color first develops, and gradually becomes opalescent, then orange, and finally cinnabar-red. In extreme dilutions the ppt. remains suspended for a long time; upon settling, the solution appears orange-red, the ppt. cinnabar-red. By means of this reaction phloroglucin can be detected in solut. of 1 : 200,000.

Weselsky (REAGENT). HNO_3 saturated at a low temperature with nitrous acid.

Weselsky (TEST PAPER). Resazurin paper. Paper gives with alkalies a blue, and with acids a red, color.

Wetzel (CARBONIC OXIDE IN BLOOD). Three volumes of a 1-% tannic-acid solut. are added to the blood after dilution with 4 volumes water. Normal blood is gradually colored gray, but blood containing carbonic oxide remains red.

Weyl (CREATININE AND CREATIN). Upon treating urine with a dil. solut. sodium nitroferricyanide and subsequently with soda lye it will acquire a handsome ruby-red color, soon changing to yellow if creatinine is present. Other sulphur compounds interfere with the test. *Salkowsky* adds acetic acid after the yellow color has appeared, and warms; the solut. becomes

blue, and Prussian blue separates out. Creatin boiled with dilute acid is converted into creatinine, and then answers the test. *Jaffe* also recommended the same test.

Weyl (NITRIC ACID IN URINE). 1.—Distil 100 Cc. urine with 30 to 40 Cc. HCl or H_2SO_4 and receive distillate in KOH. On now adding to latter metaphenylenediamine, a yellow color develops. 2.—With pyrogallic acid and H_2SO_4 distillate gives a yellowish-brown color. 3.—Distil as under No. 1, treat distillate with dil. H_2SO_4, add at once solut. sulphanilic acid, and in 8 to 10 minutes add naphtylamine hydrochlorate—a red color develops.

Wharton (MINERAL ACIDS IN VINEGAR). Add a little sugar to the vinegar and evaporate to a syrupy consistence, then add $KClO_3$ and stir for 2 minutes. If mineral acid is present the chlorate will be decomposed with ignition, chlorine being given off.

White (REAGENT). A 1:30 cobalt-nitrate solut. gives various reactions, as follows: *Phosphates*—Violet ppt. soluble in NH_3 and dilute acids. *Arsenates* and *Arsenites*—Pink ppt. soluble in NH_3 and dil. acids. *Hypophosphites*—No ppt., but if salt contains 1 part phosphate in 200, a light-blue ppt. forms. Reaction very delicate. *Ferrocyanides*—Green ppt. insoluble in NH_3 and dil. acids. *Ferricyanides*—Red ppt. insoluble in NH_3 and dil. acids.

White (SECTIONS OF BONE). Cut or grind down sections of osseous or dental tissue moderately thin and soak in ether for 24 hours. Then place for 2 to 3 days in thin collodion colored with fuchsine, made by dissolving the dye in methylated alcohol, adding requisite quantity of ether, then the pyroxylin. Subsequently place sections in alcohol to harden the collodion, and afterward grind them down to the requisite thinness between two plates of old ground glass with water and pumice powder. Finally mount, surface-dry, in stiff balsam or storax, taking care to use as little heat as possible.

Whitman (HARDENING METHODS). First treat pelagic fish ova for 5 to 10 minutes with a mixture of equal parts sea water and 0.5-% osmic-acid solut., harden for 2 days in a mixture of equal parts 0.25-% solut. platinum chloride and 1-% chromic-acid solut. Before transferring to alcohol prick the membrane.

The ova of amphibia, after being fixed, are left in a 10-% solut. sodium hypochlorite diluted with 5 to 6 volumes water until they can be shaken free.

Whitney (GLUCOSE IN URINE). The formula for this has not been divulged, but the following solution by S. H. Shieb is practically identical in action, and was repeatedly standardized by adding known quantities of pure grape-sugar to non-diabetic urine:

a.—Ammonium sulphate (purest), 1.2 Gm.; copper sulphate (purest), 2.6 Gm.; distilled water, 50 Cc.

b.—Caustic potassa (by alcohol), 20 Gm.; distilled water, 50 Cc.

Dissolve, and when cool add glycerin, 50 Cc.; ammonia water, sp. gr. 0.960, 300 Cc. Add *a* to *b* and dilute the whole to 500 Cc. with distilled water. Stopper securely and shake till thoroughly mixed.

As to the method: Heat 1 fl. dram of this solution in a test-tube to boiling. Add the urine drop by drop, at slow intervals, boiling after each addition until the blue color has been discharged and the fluid has a light amber color or is colorless.

17	minims	urine	represent	1	grain	sugar	per	fl. oz.
9	"	"	"	2	grains	"	"	"
7	"	"	"	3	"	"	"	"
6	"	"	"	4	"	"	"	"
5	"	"	"	5	"	"	"	"
5	"	"	"	6	"	"	"	"
4	"	"	"	7	"	"	"	"
4	"	"	"	8	"	"	"	"
3	"	"	"	9	"	"	"	"
3	"	"	"	10	"	"	"	"

If the urine contains more than 10 grn. of sugar per ounce, it must be diluted with an equal quantity of water, and the number of grains per fl. ounce multiplied by two.—*Med. Exam. and Pract.*

Wibel (WATER IN BUTTER). Dissolve butter in ether saturated with water and pour solut. into a narrow graduated tube containing a measured quantity of salt solut. mixed with some

acetic acid and litmus tincture. Mix the two liquids by inclining the tube up and down, and allow to settle, then observe increase in volume of red solut.

Wickersheimer (PRESERVATIVE SOLUTION). 100 Gm. alum, 25 Gm. common salt, 12 Gm. saltpeter, 60 Gm. potassium carbonate, and 20 Gm. arsenous acid, dissolved in 3 liters water.

Widal (TYPHOID). One drop blood serum of a patient suspected of typhoid is added to 10 drops of a typhoid bacillus culture 24 hours old, and stirred together. If the disease is typhoid, small particles will be observed under the microscope consisting of coagulated motionless bacteria. If the case be not typhoid the organisms will be freely motile. The serum of other infectious diseases exhibits the same conduct. As the reaction originally emanated from *Gruber*, it is latterly described as *Gruber-Widal's* reaction (compare also *Pfeiffer's* reaction).

Widal-Gruber (TYPHOID). See *Widal.*

Wiederhold (ROSIN OILS; MINERAL OILS). Rosin oils dissolve in acetone in almost every proportion; mineral oils are mostly quite insoluble. Some few cylinder oils are sparingly soluble.

Wiederholt (GENUINE RUM AND COGNAC). Upon treating 10 Cc. of sample with 3 Cc. conc. H_2SO_4 (sp. gr. 1.84) and allowing mixture to cool, the aroma of pure rum is retained, while that of the artificial product is destroyed. Upon treating pure cognac with a few drops of dil. solut. Fe_2Cl_6 a black ppt. forms. Artificial cognac does not give this test; at the most, an ill-colored ppt. is slowly deposited.

Wieger-Born (QUINCE MUCILAGE). See *Born-Wieger.*

Wiesner (LIGNIN). 1.—Woody fibers are stained golden-yellow by an acid solution of aniline sulphate, while pure cellulose is not affected. 2.—0.5-% phloroglucin solut., which, together with HCl, colors woody fibers yellow, is also known as *Wiesner's* reagent.

Wildenstein (COPPER AND IRON). A blue color is caused by tincture logwood.

Wilder (TURMERIC IN MUSTARD OR RHUBARB). Mix suspected powder with any volatile oil (fennel, anise, etc.) and examine under microscope. If turmeric present, the specks will be surrounded by a yellow zone, while the color of the particles of rhubarb or mustard will be brightened. If turmeric absent,

the microscopical field will remain colorless, while turmeric, if present, will instantly color the whole or part of the field yellow.

Wiley (CHLOROCHROMIC ACID). A blue-violet color develops on adding a small crystal of strychnine to a drop H_2SO_4, then stirring with a glass rod moistened with chlorochromic acid.

Willeband (STAIN FOR BLOOD). Mix equal quantities of a 0.5-% solut. eosine in 70-% alcohol and a conc. aqueous solut. methylene blue. To 50 Cc. of the mixture add by drops 10 to 15 drops of 1-% acetic acid. Heat specimens with fluid several times for 5 to 10 minutes until vapors are given off. Erythrocites are stained red; nuclei, sharply dark-blue; neutrophiles, violet; acidophiles, pure red; mast cells, intensely blue.

Wilson (NITROUS ACID). On adding a little resorcin to H_2SO_4 containing HNO_2 and shaking with 5 Cc. water, a yellow color results.

Wimmer (PURITY OF OLIVE OIL). Note effects produced on passing nitrous gas through the oil.

Windisch (CHERRY SYRUP IN RASPBERRY SYRUP). Distil 20 to 30 Cc. syrup until 2 Cc. distillate are received. To this add 1 drop each tincture guaiac and very dil. $CuSO_4$ solut.—a blue fugitive color indicates presence of HCN. If color is faint, add a little chloroform—on shaking, chloroform becomes colored. Method also suitable for cherry wine in red wine.

Windisch (CHERRY SYRUP IN RASPBERRY SYRUP). Distil 20 to 30 Cc. syrup until 2 Cc. distillate are obtained. To this add 1 drop each of tincture guaiac and very dil. solut. $CuSO_4$—a fugitive blue color indicates presence of HCN (from the amygdalin in the cherry stone).

Winkler (ALKALOIDS). See *Mayer's* reagent.

Winkler (WATER IN ALCOHOL). Cobalt chloride is turned red if water be present.

Winkler (FREE HYDROCHLORIC ACID IN GASTRIC JUICE). Reagent is a 5-% solut. (or a 10-% chloroformic solut.) of alpha-naphtol. Add a few grains dextrose to filtered gastric juice in a porcelain dish, and then add a few drops reagent. On carefully heating, a bluish-violet zone forms at close of evaporation (best conducted on a water-bath). With 0.04-% HCl results are still certain with careful manipulation. Reaction does not

occur if free acid absent; it is afforded, however, by H_2SO_4 and H_3PO_4. Lactic and acetic acids do not give the reaction.

Winkler (IODINE). A blue color is produced on addition of sodium nitrite and starch paste.

Winkler (KINOVIC ACID). A dirty-green color and ppt. are produced on adding solut. $CuSO_4$.

Wislicenus-Landsberg (MORPHINE IN URINE). See *Landsberg-Wislicenus.*

Wissowsky (STAIN FOR BLOOD). First treat with solut. of equal parts of eosine and alum in 200 parts alcohol, then with hematoxylin.

Wittmack (WHEAT AND RYE FLOUR). One Gm. flour is heated with 50 Cc. water on the water-bath to exactly 61° C., so that the temperature rises to 62.5° after removal from the bath. When settled, the deposit is examined microscopically. The starch grains of wheat will not have changed their form, except a slight swelling; those of rye will be nearly all burst and distorted.

Wittstein (FOREIGN STARCH IN CHOCOLATE). On boiling and filtering, natural starch does not pass through the filter, and the filtrate therefore gives no reaction with iodine.

Wittstein (TARRY MATTER IN AMMONIA). A brownish-red color develops on supersaturating ammonia with moderately strong nitric acid if tarry matter present.

Witz (MINERAL ACIDS IN VINEGAR). Methyl-violet solut. is turned blue or green on adding 2 drops to 25 Cc. vinegar containing mineral acid.

Woehler (PHOSPHORUS). Treat suspected liquid in a *Marsh's* apparatus, ignite gas evolved, and let flame impinge on a porcelain plate. If phosphoretted hydrogen present the flame is colored green.

Woehler-Liebig (UREA). See *Liebig-Woehler.*

Woerner (POTASSIUM). A 10-% aqueous solut. phosphotungstic acid gives with neutral or acid potassium salts a white ppt. In acid solut. the ppt. is coarsely crystalline; in neutral solut. exceedingly fine. Slight warmth hastens pptn. Ba, Sr, Ca, and Mg salts are not pptd. by reagent. NH_3 salts are.

Wolesky (WOOD FIBER IN PAPER). Dissolve 1 Gm. diphenylamine in 50 Cc. alcohol and 5 or 6 Cc. conc. H_2SO_4 (or HCl).

According to quantity of wood fiber present in the paper, different shades of orange-red will appear upon moistening with the reagent, and more particularly on drying.

Wolf (INDICATOR). Ferric salicylate is specially adapted as an indicator in estimating boric acid in borax, as well as K_2CO_3 and $NaCO_3$. For details see MERCK'S REPORT, X, p. 159.

Wolf (Naphtols). Alpha- or beta-naphtol dissolved in alcoholic KOH yields, upon heating with chloroform to 50° C., a clear blue solution, which changes to red upon acidulating with HCl. Reaction first mentioned by *Lustgarten*.

Wolfbauer (COTTON-SEED OIL). Shake 10 Gm. oil for two minutes with 7.5 Gm. conc. HNO_3; when separated add 1 Gm. mercury and shake for four minutes. Olive oil retains its color, while the presence of 5% cotton-seed oil occasions a brown color.

Wolter (HEMATOXYLIN NERVE STAINS). 1.—Proceed as in *Kultschitzky's* method, except that sections should be stained for 24 hours in a solut. kept at 45° Cc. Afterward dip them in *Mueller's* solution and differentiate by *Pal's* method. 2.—Material hardened in *Kultschitzky's* potassium-bichromate and copper-sulphate mixture, followed by alcohol, is imbedded in celloïdin or paraffin, and cut. Mordant sections for 24 hours in a mixture of 2 parts of 10-% vanadium-chloride solut. and 3 parts 3-% aluminium-acetate solut., wash for 10 minutes in water, and stain for 24 hours in a solut. of 2 Gm. hematoxylin (dissolved in a little alcohol) in 100 Cc. of 2-% acetic acid. Next wash out the sections in 80-% alcohol containing 0.5-% HCl until they are of a light blue-red color, remove the acid by washing thoroughly in pure alcohol, dehydrate, clear with origanum oil, and mount.

Wolter (VANADIUM NERVE STAIN). See *Wolter's* second hematoxylin stain.

Woodbury (ALCOHOL IN URINE). Mix 2 Gm. urine and 1 Gm. H_2SO_4 and drop in a fragment potass. bichromate—a green color develops on mixing if alcohol present. Delicacy 2 to 3 : 1,000.

Woolsey (MORPHINE). A 1 : 10 infusion of mallow flowers differentiates morphine from other alkaloids. Morphine does not change color of infusion; the following alkaloids, however, change it immediately to dark green: *Atropine*, *homatropine*,

berberine, *brucine*, *codeine*, *coniine*, *hydrastinine*, *nicotine*, and *lobeline*. Other alkaloids which do not affect the color are the following: *Apomorphine*, *caffeine*, *cocaine*, *carpaine*, *cinchonine*, *cinchonidine*, *colchicine*, *emetine*, *hydrastine*, *hyoscine*, *narcotine*, *piperin*, *physostigmine*, *quinine*, *sanguinarine*, and *strychnine*.

Wormley (ALKALOIDS). 1.—Alcoholic solut. picric acid throws down yellow amorphous or crystalline ppts. 2.—A solut. containing 1 part I, 3 parts KI, and 60 parts water, throws down colored ppts.

Wormley (FREE SULPHURIC ACID). A crimson color appears on adding a little veratrine and evaporating to dryness on a water-bath.

Worm-Mueller (GLUCOSE). Modified *Fehling's* solution, consisting of two solutions, a 2.5-% $CuSO_4$ solut. and a 4-% NaOH solut. containing 10% Rochelle salt. 5 Cc. suspected urine on the one hand, and 1 to 3 Cc. $CuSO_4$ solut. with 2.5 Cc. Rochelle-salt solut. on the other, are separately heated to boiling and then mixed without shaking. *Fehling's* solution (q. v.) according to recent formulas is also prepared and kept on hand as two separate solutions.

Wright (ACONITINE). If 0.001 Gm. aconitine is distributed through a few drops moderately conc. sugar solut., and then a drop of conc. H_2SO_4 added, a rose-red zone will develop at contact line of the sugar solut. and acid, and the color will rapidly change to a dirty violet and brown.

Wurster (ALBUMIN). Modification of *Silbermann's* reaction (q. v.). Instead of conc. HCl, a mixture of the latter with $\frac{1}{10}$ to $\frac{1}{5}$ its vol. conc. H_2SO_4 is employed.

Wurster (TEST-PAPER FOR OZONE). 1.—Dimethylparaphenylenediamine Paper. Used for detecting ozone, with which it gives a bluish-violet color; it is also used for detecting H_2S, H_2O_2, turpentine oil, colophony, and wood-pulp in paper.

Wurster ("TETRA"-PAPER FOR OZONE OR HYDROGEN DIOXIDE). Filter-paper saturated with tetramethylparaphenylenediamine. Traces of ozone or hydrogen dioxide in neutral solutions or in solutions acidified with acetic acid afford an intense blue color with the paper. Upon boiling with alcohol

the blue color disappears. Instead of the tetramethyl- the dimethyl-compound may also be employed.

Wurster (TYROSIN, PURITY OF). Dissolve in boiling water and add a little quinone—a ruby-red color develops, changing to brown after 24 hours.

Wurtz-Pasteur (FUCHSINE IN WINE). See *Pasteur-Wurtz.*

Wynther-Blyth (ALUM IN BREAD OR FLOUR). Process is conducted by macerating sample with a small quantity of water and then soaking strips of gelatin in the liquid; after 12 hours the gelatin slips are removed and immersed in a mixture of equal volumes of fresh logwood tincture and sat. ammonium-carbonate solut. In the presence of alum they turn blue.

Yvon (ACETANILID ANTIFEBRIN] IN URINE). Extract urine with chloroform, evaporate, and heat residue with mercurous nitrate—a green color develops if acetanilid present.

Yvon (ALCOHOL IN CHLOROFORM). A solut. of 1 part potassium permanganate and 10 parts of KOH in 250 parts water was formerly used as a qualitative test, the violet color changing to green on shaking with chloroform containing alcohol. But as alcohol-free chloroform alone stands the test, the reaction is now employed as a means of determining the amount of alcohol present.

Yvon (ALKALOIDS). A red color appears on adding a solut. prepared by boiling 3 Gm. bismuth subnitrate with 40 Gm. water, 14 Gm. KI, and 40 drops HCl.

Yvon (BILIARY PIGMENTS). See *Paul's* test.

Young (GALLIC IN TANNIC ACID). Potassium cyanide gives a red color with gallic acid, but not with tannic acid. The color soon vanishes, but reappears on vigorous shaking. According to *Stahl* the reaction can be referred entirely to the alkalinity of the cyanide.

Zacharias (ACETIC-ACID CARMINE). Add to each 10 Cc. of *Schneider's* solution 1 drop wood vinegar.

Zacharias (ACETIC ALCOHOL). Mix 1 part of glacial acetic acid with 4 parts absolute alcohol and a few drops osmic-acid solut.

Zacharias (ALBUMINS). This reagent is an acidulated solution potassium ferrocyanide and ferric chloride.

Zacharias (IRON CARMINE). Stain objects thoroughly for several hours in acetic-acid carmine or *Mayer's* carmalum, rinse

with dilut. acetic acid, and pass them into 1-% solut. ammoniated iron citrate, taking care that no metallic instruments touch them. Leave for 2 or 3 hours till thoroughly penetrated (a few minutes only in the case of sections), then wash for several hours in distilled water, dehydrate, and mount in balsam.

Zaleski, Von- (CARBONIC OXIDE IN BLOOD). On adding 2 Cc. water and 2 drops supersaturated $CuSO_4$ solut. to 2 Cc. blood, a brick-red ppt. results if carbolic oxide present. Normal blood produces a brownish-green ppt.

Zaloziecki (INDICATOR). Alpha-naphtolbenzein. Gives with alkalies a green color, and with acids a reddish-yellow.

Zanker (FIXING LIQUID). Dissolve 5% $HgCl_2$ and some glacial acetic acid in *Mueller's* solution. Fix objects in this for several hours, wash out with water, and treat the tissues or sections with alcohol containing some tincture iodine.

Zechini (PURITY OF OLIVE OIL). Note color reactions produced on adding HNO_3 (sp. gr. 1.4).

Zeise (CARBON DISULPHIDE). A yellow ppt. is thrown down on adding a little alcoholic KOH and solut. $CuSO_4$.

Zeisel (COLCHICINE). A solut. of 0.002 Gm. colchicine in 5 Cc. water changes from yellow to olive-green and then to blackish-green on boiling for 1 to 3 minutes with 5 to 10 drops fuming HCl and 4 to 6 drops of 10-% Fe_2Cl_6 solut. Upon shaking solut. with chloroform in the presence of air, the chloroform becomes ruby-red and the aqueous solut. olive-green.

Zeller (MELANIN IN URINE). The addition of bromine water to urine containing melanin causes a yellow ppt., changing to black on standing.

Zeller (QUININE). This is the thalleioquin reaction, with bromine water (1 : 40) substituted for chlorine water.

Zellner (NATURAL INJECTIONS). Use *Mueller's* solution.

Zencker (FIXING SOLUTION). $HgCl_2$, 5 Gm.; $K_2Cr_2O_7$, 2.5 Gm.; Na_2SO_4, 1 Gm.; water 100. Before use a few drops of acetic acid are added.

Ziegler (HYDROCHLORIC ACID). Arsenous and sulphurous acids in HCl are detected by adding zinc and passing the hydrogen evolved through water containing a few drops ammoniacal copper-chloride solut., then through water containing 1 drop

solut. $AgNO_3$. Any H_2SO_3 present reacts on the copper salt; arsenous acid affects the silver solut.

Ziehen (Gold and Sublimate Stain). Leave small pieces of fresh tissue for 3 weeks to 5 months in a large quantity of a mixture containing equal parts 1-% $HgCl_2$ and gold-chloride solutions. When they have assumed a metallic red-brown color, gum them on cork and cut sections without imbedding. Treat the sections with *Lugol's* solution diluted with 4 times its bulk of water, or with dilute tincture iodine, until duly differentiated; then wash and mount balsam.

Ziehl (Carbolic Fuchsine). See *Neelsen's* solut. carbolic fuchsine.

Ziehl-Neelsen (Carbolic Fuchsine). Fuchsine, 1 Gm.; carbolic acid, 5 Gm.; alcohol, 10 Gm.; dist. water, 100 Gm. Solut. is permanent.

Ziehl-Neelsen (Staining Bacilli). Sections are removed from weak alcohol into Neelsen's carbolic fuchsine and left for 10 or 15 minutes; next decolorize in H_2SO_4 (sp. gr. 1.84) or HNO_3 (sp. gr. 1.42) diluted with 3 volumes water, rinse in 60-% alcohol, and wash in a large volume of water to remove the acid. Tubercle and leprosy bacilli are the only micro-organisms that can retain the stain after treatment with acid. If traces of HNO_2 in the HNO_3 be suspected, *Squire* recommends the use of a sat. aqueous solut. of sulphanilic acid, mixed with one-third its bulk HNO_3. The sulphanilic acid destroys any free HNO_2, which would otherwise exercise a bleaching action on the fuchsine-stained bacilli. The sections may be counter-stained with a solution of 0.5 Gm. methyl green (or 0.25 Gm. methylene blue) in 20 Cc. alcohol and 80 Cc. distilled water. Finally dehydrate in absolute alcohol, clear with cedar oil, and mount in balsam.

Zouchlos (Albumin in Urine). 1.—A mixture of 10-% potassium-sulphocyanate solut. 100 and acetic acid 20. With albumin it produces a ppt. or turbidity. Delicacy 0.007%. 2.—10 Cc. of a 2-% solut. of potassium sulphocyanate with 2 Cc. of acetic acid. 3.—Acetic acid, 1; mercuric chloride (1-% solut.), 6. Delicacy 0.04%. 4.—Potassium sulphocyanate and succinic acid, equal parts, in solid form.

Zuelzer (ALBUMIN). This is a zone reaction which occurs on overlaying albuminous urine upon conc. chromic-acid solut.

Zuelzer (GLUCOSE). A solut. of cupric oxide in soda lye is reduced by grape sugar in the cold or upon gentle warming.

Zulkowsky (STARCH SOLUTION). Heat starch with glycerin to 190° C., ppt. with alcohol, and dissolve the ppt. in water.

Zune (CULTURE SOLUTION). Gelatin 50 Gm., agar 2.5 Gm., are dissolved in 600 to 700 Gm. sterilized filtered culture-broth. The white of an egg is added, the mixture heated until this is coagulated, then filtered, and the filtrate sterilized at 105° to 110° C.

Zwaardemaker (SAFRANINE STAIN). Mix equal parts of sat. alcoholic solut. of safranine and aniline water.

INDEX OF SUBJECTS.

Abrastol in Wine.—Brand.
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Acacia.—Hager; Lassaigne; Reiche.
Acacia Injection Mass.—Bjeloussow.
Acetal.—Grodyki.
Acetanilid.—Flueckiger; Moers; Rudolf-Fischer; Stroebel; Vulpius.—IN PHENACETIN: Hirschsohn; Schroeder; Mueller.—In URINE: Yvon.
Acetic Acid, in Calcium Acetate.—Grimshaw.
Acetic Acid, Glacial, Furfurol in.—Meyer.
Acetic Acid, Pyroligneous Matter in.—Lightfoot.
Acetic-Acid Carmine.—Zacharias.
Acetic Alcohol.—Carnoy; Van Beneden-Neyt; Zacharias.
Acetic Gentian Violet.—Friedlander.
Aceto-Acetic Acid in Urine.—Arnold.
Aceto-Carmine.—Schneider.
Acetone.—Gunning; Jolles; Kraemer; Legal; Lieben; Malerba; Messinger; Moerner; Penzoldt; Sternberg; Thoms. — IN URINE: Bayer; Chautard; Drewsen; Gerhardt; Legal; Le Noble; Ralfe; Reynold; Schwicker; Stock.
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Acid Mixture.—Weissman.
Acid Number.—Hehner.
Acidophilous Mixture.—Ehrlich.
Acidulated Alcohol.—Mayer; Squire.
Acidulated Glycerin.—Squire.
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Acrolein.—Lewin.

Actiniæ, Narcotizing Mixture for.—Bianco.
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Alcohol.—Bernouilly; Berthelot; Blachez; Boettger; Borsarelli; Casoria; Davy; Debrunner; Drechsler; Fleischmann; Hardy; Istrati; Jacquemart; Lieben; Ludwig; Mann; Otto; Riche-Bardy; Savelle; Thresh; Tscheppe; Vogel; Winkler.—In CHLOROFORM: Hardy; Siebold; Yvon.—In ESSENTIAL OILS: Barbier; Dragendorff; Forney; Hager; Leonardi; McClellan-Forney; Oberdoerfer; Puscher; Redwood; Salzer; Stuart; Sulzer.—In ETHER: Frederking; Hager; Stefanelli.—In PERU BALSAM: Gawalowsky.—In URINE: Anstie; Woodbury.
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Alcohol, Acetic.—Carnoy; Van Beneden-Neyt; Zacharias.
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Alcohol, Acidulated.—Mayer; Squire
Alcohol, Amylic.—Bouvier; Hager; Jorissen.
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Alkaline Methylene Blue.—Loeffler (see " solution "); Schütz.
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Alum-Cochineal.—Csokor (or Czoker); Rabl.

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Apiol.—Jorissen.
Apomorphine.—Bedson; Mecke; Melzer; Wangerin.
Aqueous Carmine Injection.—Emery.
Arabin for Serial Sections.—Waddington.
Arbutin.—Jungmann.
Aromatic Substances in Blood.—Danielewsky.
Arsenic.—Berzelius; Bettendorf; Bougault; Braconnot; Bujwid; Cadet; Carnot; Davy; Fleitmann; Flueckiger; Fresenius-Babo; Gatehouse; Gutzeit; Hager; Hilger; Himmelmann; Johnson; Hume; Letheby; Marsh; Mayençon-Bergeret; Morton; Naylor-Braithwaite; Oster; Patrouillard; Puscher; Reichard; Reinsch; Rideal; Scheele; Schiff; Schlickum; Schneider; Siebold.
Arsenic Hydride.—Hager; Flueckiger.
Asiatic-Cholera Bacillus, Products of.—Dunham-Bujwid; Poehl.
Asphalt Injection Mass.—Budge.
Asphalt Varnish.—Kitton.
Atmosphere, Mercury Vapors in.—Gaglio.
Atropine.—Gerrard; Gulielmo; Herbst; Hinterberger; Kuborne; Mecke; Melzer; Reuss; Robin; Vitali; Wender.
Bacilli Stain.—Schultz; Ziehl-Neelsen.
Bacteria Culture-Solution for.—Fraenkel-Voge; Uschinsky.
Bacteria Cultures, Examining.—Bates.

Bacteria, in Potable Water.—Gottstein.
Bacteria, Products of, in Urine.—Baumann.
Bacteria Stain.—Blanchard; Ehrlich (gentian-violet); van Ermengen; Ernst; Fischer (for cilia); Gram; Gunther; Koch; Kuehne; Loeffler; Lugol; Schutz-Weigert; Weigert.
Balsam, Canada, for Imbedding.—Weil.
Balsam Copaiva.—Dodge-Olcott; Hager (castor oil; fatty oil); Hirschsohn (fatty oils, gurjun balsam); Maupy (castor oil); Muter (fatty oil).
Balsam Gurjun in Copaiba.—Hager; Hirschsohn.
Balsam Peru.—Gawalowski (alcohol); Gehe; Hager (benzoin); Hirschsohn (rosin).
Balsam Tolu.—Hirschsohn (rosin).
Beer.—Brand (fluorine); Hefelmann-Mann (fluorine); Rust (picric acid); Schuster (coloring matter).
Beeswax, Paraffin in.—Landott.
Belladonna Extract, Alkaloids in.—Dunstan-Ransom.
Belladonna.—Stoeder; Wasilewsky.
Benzaldehyde in Bitter-almond Water.—Spasski.
Benzene.—Biel; Brandberg; Dragendorff; Gawalowsky; Hoffmann; Lainer; Pusch; Thoms.
Benzidine.—Julius.
Benzin.—Biel; Brandberg; Dragendorff; Gawalowsky; Lainer; Pusch; Thoms.
Benzoazurin Stain.—Martin.
Benzoic Acid.—Bodde; Phipson; Schacht; Schneider; Thoms.—In BENZONAPHTOL: Griggi.
Benzonaphtol.—Griggi (benzoic acid).
Benzoin in Balsam Peru.—Hager.
Benzoins.—Hirschsohn.
Berberine.—Klunge; Perrins.
Bergamot Oil.—Gulli (oil turpentine).
Berlin-Blue Gelatin Mass.—Fol; Hager.
Berlin-Blue Injection Mass.—Bruecke; Mayer; Mueller.
Beta-Naphtol.—Liebman (alpha-naphtol); Vincent.
Bicarbonates in Carbonates.—Lunge.
Bilberry-Juice Stain.—Lavdowsky.
Biliary Acids.—Bischoff; Francis; Hay; Kuelz; Mylius; Neubauer; Oliver; Pettenkofer; Strassburg; Udransky.

Biliary Pigments. — Barral; Bartley; Basham; Brueck; Capranika; Casali; Cunisset; Deubner; Dragendorff; Drechsel; Dumontpallier; Dumontpallier-Trousseau; Fleischl; Gerard; Gerhardt; Gmelin; Heintz; Heller; Hilger; Hoppe-Seyler; Huppert; Jolles; Krehbiel; Lewin; Marechal; Masset; Neukomm; Noel; Paul; Penzoldt; Riegler; Rosenbach; Rosin; Schwanda; Seyler-Hoppe; Smith; Tiedemann-Gmelin; Triollet; Trousseau-Dumontpallier; Ultzmann; Vitali; Yvon.

Bilifuscin.—Hoffmann-Ultzmann.

Bilirubin.—Maly.—In BLOOD: Jaksch, von-.—In URINE: Greenwalt; Ott; Proescher.

Bismuth.—Field; Kobell; Leger; Muir; Schneider; Thresch.

Bitter-Almond Water.—Spasski (benzaldehyde).

Biuret.—Bruecke; Piotrowski; Rose.

Black-Brown.—Kuhne.

Bleach.—Grenacher; Pal; Ramsay (also known as Crowell's).

Bleaching.—Overton (osmic objects); Unna (chromic objects).

Bleaching Methods.—Carizzi; Gilson; Marsh (chlorine); Mayer; Pouchet; Sargent.

Bleu-de-Lyon Stain.—Baumgarten.

Blood.—Almén; Bertoni-Raymondi (HNO_2); Binz (CO); Bremer (glucose); Danielewsky (aromatic substances); Deen, van-; Falk; Ferrier; Garrod (uric acid); Helwig; Huehnefeld; Jaksch, von- (bilirubin); Ladendorf; Luff (uric acid); Preyer (CO); Raymondi-Bertoni (HNO_2); Salkowsky (CO); Schaer; Schoenbein; Selmi; Sonnenschein; Struve; Teichmann; Van Deen; Vitali; Weber; Wetzel (CO); Zaleski, von- (CO).—In URINE: Heller-Teichmann; Huehnefeld; Lechini; Rossel.

Blood Corpuscles, Fixing Solution for.—Hayem.

Blood Microscopical Examination.—Hayem.

Blood Stains.—Ganther; Kastenbine; Moore (eosine); Toison; Willebrand; Wissowsky; Rosenbach.

Blood, Turpentine Solution for Testing.—Huehnefeld.

Blueing Sections.—Mayer; Squire; Wistinghausen.

Bone Decalcification.—Busch.

Bone Staining.—Busch.

Bone, Sections of.—White.

Borax.—Turner.—In MILK: Hosaeus.

Borax Carmine.—Bourne; Gibbes; Grenacher; Mayer; Thiersch.
Borax Carmine, Lilac.—Thiersch.
Boric Acid.—Wade.
Borofuchsine.—Luebimoff.
Brain, Formaldehyde for Hardening.—Von Gieson.
Brain Tissue Stain.—Weigert.
Bread, Alum in.—Carter Bell; Wynther-Blyth.
Bromic Acid in Urine.—Rabuteau.
Bromates.—Fages.
Bromides.—Berzelius; Bill; Jones.
Bromine.—Castle; Henry-Humbert; Jorissen (iodine); Troost; Vitali.
Brucine.—Cotton; Dragendorff; Flueckiger; Gerhardt; Hager; Lyon (mixture for extracting); Mecke, Melzer; Pellagri; Short-Dunstan; Wender.
Butter.—Bach; Bischoff (melting-point); Bolley; Crook; Drouot (margarin); Erdelyi (foreign fats); Filsinger; Hager; Hummel; Jahr (melting-point); Pirette; Reichert-Miessl (foreign fats); Rideal (hydrolysis); Schoenvogel (foreign fats); Wibel (water).
Butter Yellow (Martius Yellow) in Urine.—Vitali.
Cacao Butter.—Bjorklund; Filsinger; Hager.
Cadmium.—Deniges.—In URINE: Marmé.
Cadmium Coloring Mass.—Robins.
Caffeine.—Archetti; Delff; Mecke; Rochleder; Stenhouse.—In URINE: Hammarsten.
Cajuput Oil, Cineol in.—Faulding.
Calcium.—Sonstadt.
Calcium Acetate.—Grimshaw (acetic acid).
Calculi, Urinary.—Deniges (uric acid).
Camphor in Spirit Camphor.—Mansier.
Canada Balsam.—Squire.
Canada Balsam for Imbedding.—Weil.
Cane Sugar.—Papasogli; Reich; Runge.—In MILK SUGAR: Conrady.
Cannabis Extract.—Proctor.
Cantharidin.—Eboli; Melzer.
Capsule Stain.—Friedlander; Ribbert.
Caramel in Liquor and Vinegar.—Crampton-Simons.

Carbohydrates.—Baumann; Fischer; Molisch; Schiff; Udransky-Baumann.—In URINE: Baumann.
Carbolfuchsine.—Kuehne; Neelsen; Schenck; Ziehl; Ziehl-Neelsen.
Carbol-glycerin-fuchsine.—Czaplewski.
Carbolic Acid.—Almén; Guareschi; Hager; Manseau; Prescott; Read; Rice; Runge; Rust; Thoms; Tommasi.
"Carbolic" Disinfectants, Crystallizable Phenols in.—Lowe.
Carbolic Methylene Blue.—Kuehne.
Carbon Compounds.—Nickel.
Carbon Disulphide.—Hoffmann; Vogel; Zeise.—In OIL MUSTARD: Luck.
Carbon Monoxide.—Boettger; Hoppe-Seyler (poisoning).—In BLOOD: Binz; Preger; Salkowsky.
Carbonates.—Lunge (bicarbonates); Mueller (NaOH).
Carbonic Acid.—Pettenkofer.
Carbonic Oxide.—Merget; Mermet.—In AIR: Potain-Drouin.—In BLOOD: Wetzel; Zaleski.
Carbonyl Chloride.—Ramsey (in $CHCl_3$).
Carmine.—Hoyer.
Carmine, Acetic-Acid.—Zacharias.
Carmine, Aceto-.—Schneider.
Carmine, Alcoholic.—Brass; Grenacher; Mayer.
Carmine Alum.—Grenacher; Henneguy; Mayer; Tangl.
Carmine, Aluminium-Chloride.—Mayer.
Carmine, Ammonia.—Beale; Betz; Frey; Hartig; Malassez; Ranvier.
Carmine Aniline-Blue Method.—Duval.
Carmine Blue.—Jansen.
Carmine, Borax-.—Bourne; Gibbs; Grenacher; Mayer; Thiersch.
Carmine Coloring Mass.—Robins.
Carmine Gelatin Mass.—Fol; Hoyer; Ranvier.
Carmine Glycerin Mass.—Beale.
Carmine, Hydrochloric-Acid.—Grenacher.
Carmine-Indigo Carmine.—Mayer.
Carmine Injection.—Emery (aqueous); Thiersch (mass); Ville (mass).
Carmine, Iron-.—Zacharias.
Carmine, Lilac-Borax.—Thiersch.

Carmine Method.—Cole.
Carmine, Neutral.—Boehn; Heidenhain.
Carmine, Oxalic-Acid.—Thiersch.
Carmine, Picro-.—Vignal-Ranvier.
Carmine Solution.—Cuccati; Hamann; Schweigler-Seidel (acid).
Caryophylline.—Burgess.
Cassia Oil.—Hirschsohn.
Castor Oil.—Bollet; Draper; Finkener (adulterations); Vetere, di-.—In COPAIVA: Hager; Maupy.—In CROTON OIL: Maupy.—In OLIVE OIL: Leonardi; Vetere, di-.
Catechu.—Dieterich.
Caustic Alkali.—Dobbin; Mueller (in carbonates).
Caustic-Potassa Number.—Koettstorfer.
Cedar Wood Oil in Spearmint Oil.—Kremers-Schreiner.
Cell-nucleus Stain.—Grenacher.
Celloidin.—CEMENT FOR BLOCKS: Johnson.—CLEARING SECTIONS: Nikiforow; Weigert.—MOUNTING SECTIONS: Lee.—IMBEDDING MASS: Viallanes.—IMBEDDING METHOD: Lee.—SOLUTION: Busse; Elsching.
Cellulose.—Kaiser; Lidoff; Lifschuetz; Mangin; Schultze; Schweitzer; Terreill.—SOLVENT: Cross-Bevans; Hoffmeister; Schweitzer.
Cement.—Beale; Carnoy (tolu); Csokor or Czoker (turpentine); Eulenstein; Johnson (celloidin); Kitton (white-lead); Kronig; Lovett; Marsh (gelatin); Stieda.
Cephaeline.—Paul-Cownley.
Chelerythrine.—Orlow-Horst.
Chelidonine.—Orlow-Horst.
Chenopodium Seeds in Flour.—Vogel.
Cherry Syrup in Raspberry Syrup.—Windisch.
Chinoline.—Anderson.
Chitin, Stain for.—Bethe.
Chitinous Objects, Shellac Method.—Hyatt.
Chloral Hydrate.—Fairthorne; Hirschsohn (alcoholate); Jaworowski; Ogston; Schaer-Van Ankum (alcoholate).—JELLY: Gilson.—MEDIUM: Brady; Lavdowsky.—REAGENT (for volatile oils and resins): Hehn.—SOLUTION: Munson.
Chlorates.—Braun; Deniges; Fages; Jean-Alvarez; Vitali.
Chloric Acid in Urine.—Edlefsen; Rabuteau.

Chlorides.—Jones; Jean-Alvarez; Mohr.
Chlorine.—Marsh (bleaching sections); Riley; Vitali.
Chlorine-Hydrochloric Acid.—Villiers-Fayolle.
Chlorochromic Acid.—Wiley.
Chloroform.—Hardy (alcohol); Hoffmann; Ramsey (carbonyl chloride); Siebold (alcohol); Staedeler; Vitali; Werner (amylic alcohol); Yvon (alcohol).—In ESSENTIAL OILS: Hager.—In URINE: Neubauer.
Chloro-Formic Acid.—Rabl.
Chocolate, Starch in.—Wittstein.
Cholera.—Koch; Pfeiffer (serum reaction).
Cholera Bacillus, Products of Asiatic.—Bujwid-Dunham; Poehl.
Cholesterin.—Burchard; Hager; Hesse; Liebermann; Liebreich; Moleschott; Obermueller; Salkowsky; Schiff; Tschugaeff.
Cholesterin Fats.—Burchard; Liebreich.
Chromates.—Schiff.
Chromic Acid.—Barreswil; Donath; Mandel (for proteids); Merkel; Storer.
Chromic Objects.—Unna (bleaching); Virchow.
Chromium.—Rideal-Rosenblum (compounds).
Chromo-Acetic Acid.—Bianco.
Chromo-Aceto-Osmic Acid.—Mark.
Chromo-Osmic Acid.—Flesch.
Chrysammic Acid.—Finkle.
Cilia of Bacteria.—Van Ermengen (stain).
Cinchona Alkaloids.—Dwar; Pasteur; Paul-Cownley (cupreine); Prollius (solut. for extracting); Jaworowski; Marchand.
Cinchona Barks.—Grahe.
Cinchonidine.—Paul (in quinine sulphate); Schaefer (in quin. sulphate).
Cinchonine.—Bill-Seligsohn.
Cineol.—Faulding (in oil cajuput and eucalyptus).
Cinnamic Acid.—Simon; Thoms.
Citral.—Burgess.
Citric Acid.—Cailletet; Chapman-Smith; Deniges; Hager; Papasogli-Poli; Pusch; Sabanin-Laskowski; Smith-Chapman; Stahre.—In LEMON and LIME JUICE: Warrington.—In WINE: Nessler

Citronellal.—Burgess.
Citrophen.—Moers.
Cleaning Solution for Glass Slides.—Seiler.
Clearing Mixture.—Dunham; Eyclesheimer; Gage; Nikiforow.
Clearing Sections.—Kirkby.
Clove Oil.—Flueckiger (phenol).
Coal Gas.—Boettger.
Coal-tar Dyes in Wine.—Cazeneuve; Girard.
Cobalt.—Danziger; Deniges; Gassini; Papasogli; Schoenn; Skey; Tattersall.
Cobaltous Chloride.—Stahl.
Coca.—Gunn.
Cocaine.—Biel; Giesel; Greitherr; Kuborne; Lewy; MacLagan; Mecke; Melzer; Metzger (Mezger); Orlow-Horst; Schaerge; Schell.
Cochineal Alum.—Csokor (Czoker); Rabl.
Cochineal Alum-Carmine.—Partsch.
Cochineal Fluid.—Klein.
Cochineal Stains.—Mayer.
Cochineal Tincture.—Schlickum.
Codeine.—Arnold; Dragendorff; Faby; Herse; Hesse; Kobert; Mecke; Melzer; Robin; Schneider; Tattersall; Wender.
Cod-liver Oil.—Meyer.
Cognac, Genuine.—Wiederholt.
Colchicine.—Flueckiger; Hager; Kubel; Mecke; Melzer; Snow; Wender; Zeisel.
Colophony.—Kleinenberg.
Colophony Mounting Medium.—Lee.
Coloring Matter.—In BEER: Schuster.—In URINE: Mai-Hilger.—In WINE: Boettger; Dupré; Faure; Heise; Hertz; Hilger-Mai.
Coloring Matter, Egg.—Thudichum.
Colors.—ACID and BASIC: Weingaertner.—ANILINE: Blarez.—GREEN: Puscher (arsenic).
Coniine.—Heut; Liebig; Mecke; Melzer; Stroppa-Vitali; Wender.
Copaiba.—Dodge-Olcott; Gerber (fixed oils); Enell (gurjun bals.); Hager (castor oil; fatty oils; gurjun bals.; turpentine); Hirschsohn (fatty oils; gurjun bals.); Muter (fatty oils).—In URINE: Nobel.

Copal Method.—Koch; Von Koch.
Copper.—Bach; Bellamy; Brown; Campani; Cresti; Endemann-Prochazka; Fleitmann; Hatschett; Jaworowski; Purgotti; Sabatier; Sabatin; Schoenbein; Wildenstein.—In OILS: Cailletet. — In PRESERVED PEAS: Nikitin. — In PRESERVES: Tschirch.—In URINE: Hahnemann.—In VINEGAR: Hager.—In WATER: Guldensteeden.
Copper-Ferrocyanide Coloring Mass.—Robins.
Copper-Hematoxylin.—Benda.
Copper Sulphate.—Griggi (iron); Thoms.
Coriander Oil.—Schimmel.
Corn-Cockle Seeds in Flour.—Petermann.
Cornutine.—Keller.
Corrosion Method.—Altmann; Noll.
Cotton.—Boettger; Jacquemin; Liebermann. — In WOOLLEN FABRICS: Jandrier; Overbeck. See also CELLULOSE.
Cottonseed Oil.—Bechi; Deiss; Halphen; Hirschsohn; Labiche; Millian; Tortelli-Ruggieri; Wolfbauer. — In LARD: Conroy; Gantter.—In OLIVE OIL: Brulle; Hauchecorne; Heydenreich.
Creatin.—Hofmeister; Kerner; Loew; Weyl.
Creatinine.—Engel; Joffe; Kerner; Kolisch; Maschke; Salkowsky; Thudichum; Weyl.—In URINE: Grocco; Stillingfleet-Johnson.
Creosote.—Clark; Flueckiger; Fonzes-Diacon; Frisch; Gorup-Besanez; Morson; Read; Rust; Thoms; Vreven.
Creosote Mounting Mixture.—Beale.
Croton Oil.—Maisch; Maupy (castor oil).—In TINCT. IODINE: Durien.
Cruciferous Oils.—Grehant; Miahle.—In OLIVE OIL: Schneider.
Crystallizable Phenols in "Carbolic" Disinfectants.—Lowe.
Crystals.—Roussin.
Culture Medium.—Pasteur; Raulin.
Culture Solutions.—Cohn; Fraenkel-Voge; Miquel; Uschinsky; Zune.
Cupraloin.—Klunge.
Cupreine in Cinchona Alkaloids.—Paul-Cownley.
Curarine.—Dragendorff; Flueckiger.
Curcuma.—Howie; Maisch.
Curcuma Ferment Paper for Urea.—Musculus.

Cyanides.—Carey Lea; Hannay; Liebig.
Cystein.—Andreasch.
Cystine.—Baumann-Goldman; Liebig; Moer, van de-; Mueller; Rauwerda.
Dahlia Stain.—Ehrlich.
Dammar Solution.—Pfitzner; Squire.
Decalcification Fluids.—Bayerl; Busch; Ebner, von-; Fol; Gage; Haug; Hopewell-Smith (teeth); Marsh; Ranvier; Squire; Thoma; Waldeyer.
Decomposed Sausage.—Eber.
Delphinine.—Mecke; Melzer; Tattersall.
Desilicification Process.—Mayer.
Dextrin.—Lipp.—In ACACIA: Hager.
Dextrin Freezing Mass.—Webb.
Diacetic Acid in Urine.—Jaksch, Von-.
Diamines.—Baumann.
Diazo Reaction.—Brunner; Ehrlich; Friedewald-Ehrlich (typhoid and tubercle).
Diazo Compounds.—Liebermann.
Digestion Fluid.—Beale; Bickfalri; Bruecke; Kuskow; Schiefferdecker.
Digitalin.—Dragendorff; Flueckiger; Lafon; Melzer; Otto; Pape; Wender.
Digitalis.—Keller-Kiliani.
Digitalis Principles.—Keller.
Dinitroamido-phenate.—Frebault (indicator).
Dionin.—Kobert.
Diphenylamine-Sulphate Solution.—Kopp; Pollet.
Dissociation Medium.—Stirling.
Double Imbedding Method.—Kultschitzky; Ryder.
Double Stain.—Benda; Gibbs; Kossinski; Seiler; Stile.
Dragon's Blood.—Hirschsohn.
Duboisine.—Emden, Van-.
Dulcin.—Wender.—In BEVERAGES: Morpurgo.
Dyes, Aniline.—Blarez; Letheby; Ludwig.—In WINE: Cazeneuve; Girard.
Dyes, Artificial, in Wine.—Arata.
Dyes, Green.—Puscher (arsenic).
Egg Coloring Matter.—Thudichum.

Elaterin.—Dragendorff; Lindo; Power.
Embryo Stain.—Allen.
Emetine.—Paul-Cownley; Podwyssotzki; Power; Snelling.
Eosine.—Baeyer; Moore (blood stain); Wagner.
Eosine-Methyl Green.—Calberla.
Eosine-Methylene Blue.—Chenzinsky.
Eosine-Hematoxylin.—Cole (method); Everard-Demoor-Massart; Hickson (method); List (stain); Massart; Renaut.
Epithelium.—In URINE: Jakobsohn (stain for).—MACERATION METHOD: Minot; Mitrophanow.
Ergot.—Keller (ergotinine).—In RYE FLOUR: Boettger.
Ergotinine in Ergot.—Keller.
Eserine.—Da Silva; Saul.
Essential Oils.—Barbier (alcohol); Flueckiger; Forney (alcohol); Hager (alcohol; chloroform); Hoppe; Leonardi (alcohol); Leuch (water); McClellan-Forney (alcohol); Maier (turpentine); Maisch; Merz (turpentine); Oberdoerffer (alcohol); Perrot; Redwood (alcohol); Rhein (fixed oils); Salzer (alcohol); Stuart (alcohol); Sulzer (alcohol); Walz (fixed oils).
Estragol.—Chapman.
Ether.—Boettger (water); Frederking (alcohol); Hager (alcohol); Langbeck (methyl alcohol); Mann (water); Napier (water); Romei (water); Stefanelli (alcohol).
Ethereal Oils.—Elram; Puscher (alcohol); Tuschen.
Eucalyptus Oil.—Faulding (cineol).
Eugenol.—Burgess; Chapman.
Euphorbium.—Flueckiger.
Eupittonic Acid.—Hoffmann (indicator).
Exalgin.—Moers.
Examination Liquid.—Henking (ova); Pictet.
Excrements in Oil and Water.—Finkelberg.
Exposure Mounting.—Cole.
Extract Belladonna.—Dunstan-Ransom (alkaloids in); Stoeder.
Extract, Cannabis.—Procter.
Extract Henbane.—Stoeder.
Extracts, Fluid, Glycerin in.—Linde.
Extraneous Organisms Among Typhoid Fever Bacilli.—Parietti.
Fabrics, Textile.—Lidoff; Liebermann; Mangin.

Fats.—Allen; Burchard; Holde; Valenta; Welmann.—In BUTTER: Erdelyi; Reichert-Meissl; Schoenvogel.—In MILK: Adams; Leffman-Beam; Werner-Schmidt.—In PETROLATUM: Crouzel-Dupin.

Fatty Acids.—David; Geitel.

Fatty Oils.—Barbot; Behren; Boudart; Cailletet; Crace-Calvert; Glaessner; Jacobsen; Livache.—In COPAIVA: Hager; Hirschsohn; Muter.—In MINERAL OILS: Lux.

Fecal Matter in Water.—Griess.

Ferment Paper for Urea.—Musculus.

Ferric-Chloride Stain.—Fol; Hoggan.

Ferric Salts.—Porret; Vogel.

Ferruginous Nucleins.—Just (iron).

Fiber.—ANIMAL: Boettger; Frankenstein.—COTTON: Boettger.—LINEN: Boettger.—SILK: Peltier.—TEXTILE: Persoz.—VEGETABLE: Frankenstein. — WOOD (in paper): Friedlander; Wolesky.—WOOL: Lidoff; Peltier.

Fibrin Stain.—Weigert.

Fixative.—ALBUMIN: Fol; Mann; Mayer.—GELATIN: Fol.—SHELLAC: Giesbrecht; Mayer.

Fixed Oils.—Bieber; Calvert; Hager; Heidenreich; Massie; Merz; Nickles; Poutet; Roth; Royere, de la-; Ruempler.—In COPAIVA: Gerber.—In ESSENTIAL OILS: Rhien; Walz.

Fixing Liquid.—Altmann; Bedot (pelagic animals); Blanc (infusoria); Carter; Ehler (annilids); Eisig; Flemming; Foa; Fol; Fraenkel; Friedlander; Gaule; Hayem (corpuscles); Heidenhain; Klein; Kollmann; Kultschitzky; Lang; Merkel; Niessing; Perenyi; Podwyssotzki; Rabl; Schenck; Zanker; Zencker.

Flagella Staining.—Bunge; Crookshank; Hessert; Koch; Loeffler; Lutesch; Nicholle-Morax; Sclavo; Trenkmann; Van Ermengem.

Flavescin.—Lux (indicator).

Flax.—Liebermann.

Flour.—Carter-Bell (alum); Donny (leguminous flour); Himly (mineral substances); Lassaigne; Steenbuch; Vogel (chenopodium seed; bran; corn-cockle; vetch; ergot; buckwheat); Wynter-Blyth (alum);.—In STARCH: Boettger.

Fluid Extracts.—Linde (glycerin).

Fluorine.—In BEER: Brand; Hefelmann-Mann.—In WINE: Niviere-Hubert.
Fluorescin-Clove-Oil Stain.—Kuehne.
Formaldehyde.—Hehner; Lebbin; Pilhastry; Richmond-Bosely; Rimini.—In MILK: Hehner.—MIXTURE: Gage; Durig; Hermann; Kopsch; Lavdowsky; Lee; Parker-Floyd.—STAIN: Ohlmacher.
Formalin Method.—Gieson, Van-.
Formic Acid.—Broccardi; Lieben; Ranvier.
Frangulin.—Phipson.
Free Acids.—Donath; Duflos; Herzberg; Mohr (mineral); Rheoch (mineral); Smith.—In ALUMINIUM SULPHATE: Hager.—In FIXED OILS: Ruempler.
Freezing Mass.—Jacob; Kuehne (aniseed oil); Webb (dextrin).
Freezing Process.—Cole; Rollett.
Fructose.—Seliwanoff.
Fruit Jellies, Gelatin in.—Henzold.
Fruit Juices, Fuchsine in.—Puscher.
Fruit Syrups, Fuchsine in.—Romei.
Fuchsine.—Chancel; Valentin.—In FRUIT JUICES: Puscher.—In FRUIT SYRUPS: Romei.—In WINE: Geissler; Pasteur-Wurz; Pradines.
Fuchsine Bacteria Stain.—Kuehne.
Fuchsine-Methylene Blue.—Baumgarten.
Fuchsine Solution.—Frey.
Fuchsine Stain for Nerve Cells.—Nissl.
Furfurol in Glacial Acetic Acid.—Meyer.
Fusel Oil.—Betelli; Vitali.—In ALCOHOL: Savelle.
Gallic Acid.—Dudley; Flueckiger; Gayard; Griggi; Guyard; Hager; Oliver; Proctor; Watson.—In TANNINS: Young.
Gas, Inflammable.—Clowes.
Gas, Illuminating, in Water.—Himly.
Gastric Juice (Hydrochloric Acid).—Contejean; Ewald; Guenzburg; Kost; Luttke; Maly; Miller, van-; Mohr; Rabuteau; Riegel; Schuchardt; Siringo; Szabo; Toepfer; Van der Velden; Velden; Winkler.
Gelatin.—Carey Lea.—In FRUIT JELLIES: Henzold.
Gelatin-Carmine Injection.—Ranvier.
Gelatin Cement for Glycerin Mounts.—Marsh.

Gelatin Fixative.—Fol.
Gelatin, Glycerin-.—Kleb.
Gelatin Mass.—Robins.—BERLIN-BLUE: Fol; Hoyer.—CARMINE: Fol; Hoyer.—IMBEDDING: Brunotti; Sollas.—LEAD-CHROMATE: Hoyer.—SILVER-NITRATE: Hoyer.
Gelatin Process.—Alleger; Gray.
Gentian-Violet Method.—Bizzozero; Ehrlich; Flemming; Nissen.
Globulin.—Kauder; Pohl.—In URINE: Hammarsten; Paton; Senator-Lehmann.
Glucose.—Agostini; Almen; Almen-Nylander; Baeyer; Barfoed; Barreswil; Boettger; Braun; Bremer; Bretet; Bruecke; Bruns-Bizzari; Caillian; Campani; Cappagnoli; Cassamajor; Crismer; Dudley; Duyk; Fabre-Domergue; Focke; Franqui-Van de Vyvere; Frommerherz; Gerrard; Grismer; Hager; Haine; Haines; Heinrich; Heller; Horsley; Huizinga; Jaworowski; Knapp; Krueger; Lagrange; Lehmann; Lindo; Loewe; Loewenthal; Maschke; Mathieu-Plessy; Maumené; Mazzara; Mohr; Moore; Moore-Heller; Mulder; Neumann-Wender; Nylander; Oliver; Pasteur; Pavy; Peligot; Pellet; Pelouze; Pollacci; Power; Pratesi; Purdy; Quirini; Reich; Riegler; Roberts; Rosenbach; Ruber; Rubner; Sachsse; Sachsse-Heinrich; Schiff; Schmidt; Schmiedeberg; Schreiter; Soldaini; Tollens; Trommer; Violette; Vogel; Warren; Wayne; Wender; Wender-Neumann; Whitney; Worm-Mueller; Zuelzer.
Glucose Medium.—Brun.
Glucosides.—Brunner; Formanek; Mecke; Melzer; Schlagdenhauffen.
Glycerin.—Barbsche; Boettger (sugar); Bougault (arsenic); Deane; Deniges; Donath-Mayrhofer; Fol; Gruenhut; Hager; Reichl; Ritsert; Senier; Siebold (arsenic); Udransky-Baumann.—In FLUID EXTRACTS: Linde.—In URINE: Baumann; Luchsinger.
Glycerin, Acidulated.—Squire.
Glycerin and Gum.—Faris; Shimer; Squire.
Glycerin Gelatin.—Kleb.
Glycerin Hematoxylin.—Renaut.
Glycerin Jelly.—Beale; Brandt; Kaiser; Kleb; Lawrence; Seaman; Squire.
Glycerin Mass.—CARMINE: Beale.—PRUSSIAN-BLUE: Beale.

Glycerin Medium.—Haentsch; Jaeger.
Glycerin Mixture.—Calberla; Lee.
Glycerin Mountant, Alkaline.—Kirkby.
Glycerin Mounts, Turpentine Cement for closing.—Csokor (Czoker).
Glycerin Preservative.—Flemming.
Glychemalum.—Mayer.
Glycocoll.—Horsford.
Glyconuric Acid.—Bial.
Glycotannoids.—Kunz-Krause; Liebermann.
Gold.—Cohnheim; Darton; Kern.—In SILVER NITRATE: Schuttleworth.
Gold and Sublimate Stain.—Ziehen.
Gold and Iron Method.—Upson.
Gold and Vanadium Method.—Upson.
Gold Chloride.—Branson.
Gold Method.—Henocque; Kolossow; Lowit; Manfredi; Mitrophanow; Nesteroffsky; Upson; Viallanes.
Golds Stain.—Bastian; Hoyer; Underwood.
Gonococcus Stain.—Neisser; Pick; Schütz; Steinschneider-Galewski.
Green Injection Mass.—Thiersch.
Guaiac Resin.—Hirschsohn (rosin).
Guaiacol.—Adrian; Fonzes-Diacon; Vreven.
Guanidine Salts.—Schulze.
Guanine.—Capranika.
Gum and Glycerin.—Squire.—JELLY: Shimer.—MEDIUM: Langerhan.
Gurjun Balsam.—Flueckiger; Hirschsohn.—In COPAIVA: Enell; Hager; Hirschsohn.—In URINE: Nobel.
Halogens.—Beilstein.
Hardening Fluids.—Betz; Blum; Bunger; Carnoy; Erlicki; Flemming; Gilson; Goette; Johnson; Mueller; Perenyi; Pritchard; Souza, de-.
Hardening Methods.—Lewis (brain); Whitman.
Hemacalcium.—Mayer.
Hemalum, Acid.—Mayer.
Hemapheinic Urine.—Munk.

Hematein.—CARMINE-INDIGO: Mayer.—SOLUTION: Hansen.—STAIN: Rawit.
Hematophyrin.—Salkowsky.
Hematoxylin.—Boehmer; Cole; Delafield; Hamilton; Heidenhain; Kleinenberg; Maschke; Weigert.—ACID: Butschli; Ehrlich.—AMMONIATED: Ehrlich.—BERLIN-BLUE REGENERATION: Weigert.—METHOD: Pal.—STAIN: Apathy Foa; Grenacher; Pal; Squire; Unna; Wolter (nerve).
Hematoxylin-Copper.—Benda.
Hematoxylin-Eosine.—Cole; Everard-Demoor-Massart; Hickson; List; Massart; Renaut.
Hematoxylin-Glycerin.—Renaut.
Hematoxylin-Iron.—Benda; Butchli; Heidenhain.
Hemin Crystals.—SOLUTION FOR PREPARING: Melasse.
Hemoglobin.—Heller; Kobert.—In URINE: Mahomed; Stevenson.
Heroin.—Goldmann; Kobert.
Hemin Crystals (preparing).—Malassez.
Heroin.—Kobert.
Hetero-Albumose in Urine.—Tyson.
Heteroxanthin.—Salomon.
Hippuric Acid.—Luecke; Phipson.
Horse Meat.—Braeutigam-Edelmann.
Hydriodic Acid in Urine.—Scivoletto.
Hydrobromic Acid.—Villiers-Fayolle.
Hydrocarbons.—Fritsche.
Hydrochloric Acid.—Boas; Leewenthal-Lenssen; Loewenthal; Oster (arsenic); Reale; Villiers-Fayolle; Ziegler.—In GASTRIC JUICE: Contejean; Ewald; Guenzburg; Kost; Luttke; Maly; Miller, von-; Mohr; Rabuteau; Riegel; Schuchardt; Siringo; Szabo; Toepfer; Uffelmann; Van der Velden; Velden; Winkler.
Hydrochloric-Acid Carmine.—Grenacher.
Hydrocyanic Acid.—Almén; Barry; Barfoed; Carey Lea; Deniges; Froehde; Hlaziwetz; Ottner; Lassaigne; Liebig; Pagenstecher; Payer; Schoenbein; Schoenbein-Pagenstecher; Vortmann.—In AMYL NITRITE: Hager.
Hydrogen Dioxide.—Bach; Barralet; Boettger; Deniges; Kassner; Schoenbein; Schoenn; Struve; Traub; Weltzien; Wurster.
Hydrogen Phosphide.—Scherer.

Hydrogen Sulphide.—Fischer; Ganassini; Merget.—In URINE: Mueller.
Hydrolysis of Butter Fat.—Rideal.
Hydroquinone.—Baumann-Preusse.—In URINE: Neubauer.
Hyoscyamine.—Gerrard.
Hypochlorous Acid.—Kolter.
Hypodermoclysis, Solution for.—Hayem.
Hyposulphites.—Alvarez-Jean; Carey Lea; Haugk.
Hypoxanthine.—Kossel.
Illuminating Gas.—Merget; Wartha (sulphur).—In WATER: Himly.
Imbedding.—MASS: Brunotti; Fischer; Kadyi; Poelzam; Stricker; Viallanes.—METHOD: Butchli; Duval; Ehrenbaum; Gilson; Ide; Joliet; Kultschitzky; Lee; Ryder.—SOLUTION: Tapping.
Impregnation Method.—Altmann.—METHYLENE-BLUE: Dogiel.—PRUSSIAN-BLUE: Leber.—SILVER: Tartuferi.
Impregnation Mixture, Mercuric.—Cox.
Indican.—In PLANTS: Molisch.—In URINE: Carter; Hammarsten. Heller; Jaffe; Klett; Loubian; MacMunn; Obermayer; Weber; Weil-Gilbert.
Indicators.—Autenrieth; Boettger; Bolton; Borntraeger; Crismer; Dechan; Degener; Engel-Ville; Fischer-Phillip; Fittig; Formanek; Frebault; Henry, de-; Gawalowski; Hoffmann; Kruger; Lachaux; Lehmann-Petri; Luck; Lunge; Lux; Marsh; Maschke; Miller; Oser-Kalmann; Pellagri; Richter; Riegel; Riegler; Schaal; Schlickum; Simon; Spiegel; Stevenin; Storch; Von Duyck; Von Müller; Weiske; Weselsky; Wolff; Zaloziecki.
Indigo-Carmine with Indigo or Hematein.—Mayer.
Indigo-Carmine and Aniline Blue.—Maschold.
Indigo-Carmine, Oxalic-Acid.—Thiersch.
Indigo-Red in Urine.—Rosenbach.
Indol.—Bayer; Guezda; Nencki; Salkowski.—In BACTERIAL CULTURES: Kitasato-Salkowski.
Indulin Stain.—Calberla.
Inflammable Gas.—Clowes.
Infusoria.—FIXING: Blanc.—METHOD: Entz.—QUIETING: Eismond.

Injection Fluid.—CARMINE: Emery.—RED: Bruecke.
Injection Mass.—ACACIA: Bjeloussow.—ASPHALT: Budge.—BERLIN-BLUE: Bruecke; Mayer; Mueller.—CARMINE: Joseph; Thiersch; Ville.—GREEN: Thiersch.—IODINE: Lugol.—LEAD-CHROMATE: Thiersch.—PRUSSIAN-BLUE: Thiersch.—SHELLAC: Hoyer.
Ink Injection.—Taguchi.
Inorganic Acids.—Geoghan.
Inosite.—Scherer; Seidel.—In URINE: Gallois.
Invert Stain.—Rawitz.
Iodates.—Corne.—In IODIDES: Pollacci; Schering.
Iodic Acid.—Biltz; Reichardt.—In NITRIC ACID: Hager; Hilger.
Iodides.—Hempel; Jones; Pollacci (iodates); Schering (iodates).—In SALIVA: Bourget.—In URINE: Bourget.
Iodine.—Alfraise; Carey Lea; Castle; Chatin Gaultier de Claubry; Filhol; Grange; Henry; Henry-Humbert; Jacquemin; Koettstorfer; Laronde; Lassaigne; Maier; Marchand; Overbeck; Peloggio; Price; Rabourdin; Reynoso; Stanford; Tessier; Thomson; Tilden; Vitali; Wachhausen; Winkler.—In BROMINE: Jorissen.—In COMPOUNDS: Thoms.—In URINE: Harnack; Jolles; Sandlund; Seivolete.
Iodine Fixing.—Overton.
Iodine Number.—Huebl.
Iodine-Potassium Iodide.—Kuehne.
Iodine Solution.—Gram; Huebl-Waller; Wagner-Fresenius.
Iodine Test-paper.—Sabrazes-Deniges.
Iodized Serum.—Frey; Ranvier; Schultze.
Iodoform.—Deniges; Greshoff; Guyot; Lustgarten.
Iron.—Andreasch; Bellamy; Deniges; Fairbank (phosphorus); Fuge; Lasaulx; Wildenstein.—In COPPER SULPHATE: Griggi.—In FERRUGINOUS NUCLEINS and NUCLEO-ALBUMINS: Just.—In TISSUES: Tizzoni.
Iron Carmine.—Zacharias.
Iron Citrate.—Griggi.
Iron-Hematoxylin.—Benda; Butschli; Heidenhain.
Iron Isopyrotritarate.—Simon.
Iron Method.—Upson.
Iron-Persulphate Solution.—Monsel.
Iron-Pyrogallate Stain.—Roosevelt.

Isatropyl Cocaine.—MacLagan.
Iso-Eugenol.—Chapman.
Iso-Saffrol.—Chapman.
Jalap.—Buchner.
Kairin in Urine.—Petri; Renzone.
Kermes Coloring in Wine.—Heise; Hilger-Mai.
"Kernschwarz" Stain.—Lee.
Ketones.—Bela-von Bitto; Fischer; Villiers-Fayolle.
Ketoses.—Sieben.
Kinovic Acid.—Winkler.
Kousso Flowers.—Kühl.
Lactic Acid.—Boas; Uffelmann.
Lactose.—Rosenbach.
Lanolin.—Liebermann.
Lard Oil, Cottonseed in.—Conroy; Gantter.
Lead.—Blyth; Bobierre; Fordos.—In TINFOIL: Kopp.—In URINE: Abram; Hahnemann.
Lead Chromate.—GELATIN MASS: Hoyer.—INJECTION MASS: Thiersch.
Lead Ore.—Krutwig (silver).
Leguminous Flour in Wheat Flour.—Donny.
Lemon-Juice Method.—Ranvier.
Lemon Oil.—Schimmel.
Leprosy Bacillus Stain.—Bates; Baumgarten; Luebimoff; Lustgarten; Lutz-Unna; Unna.
Leucine.—Hofmeister; Scherer.—In URINE: Frerich.
Levulose.—Ihl-Pechmann; Seliwanoff.
Lignin.—Hegler; Hoehnel, von-; Mäule; Niggl; Wiesner.
Lilac Borax Carmine.—Thiersch.
Lemon Juice.—Warington (citric acid).
Lime Juice.—Warington (citric acid).
Limonene.—Burgess.
Linalol.—Burgess.
Linalyl Acetate.—Burgess.
Linen Fibers.—Boettger.
Linseed Oil.—Morrell.—In OLIVE OIL: Millian.
Lithium Carbonate.—Symons (sodium).
Lithium Carmine.—Orth.
Lubricants from Petroleum, Tarry Constituents of.—Holde.

Lubricating Oils, Soap in.—Schweitzer.
Mace, Bombay.—Boehm; Busse; Hefelmann; Waage.
Maceration Media.—Bela-Haller; Borme; Calberla; Hertwig; Kuehne; Landois; Lavdowsky; Loeffler; Mobin; Schultze; Soulier; Trenkmann.
Maceration Method.—Minot; Mitrophanow.
Magenta Stain.—Gibbes.
Magnesia.—Schaffgott.
Magnesia Mixture.—Gilbert.
Magnesium.—Deniges.
Magnesium Salts.—Lepel; Schlagdenhauffen.
Malic Acid.—Papasogli-Poli.
Manganese.—Boettger; Campani; Davy; Deniges.—In ZINC: Gayard; Guyard.
Manganese-Chloride Solution.—Pictet.
Margarin.—Partheil.—In BUTTER: Drouot; Soxhlet.
Martius Yellow.—In PASTRY: Schaefer.—In URINE: Vitali.
"Mastzellen."—Ehrlich.
Media.—CULTURE: Pasteur.—DISSOCIATION: Stirling.—MACERATION: Lavdowsky; Loeffler; Mobin.—MOUNTING: Apathy; Brady; Brun; Deane; Fabre-Domergue; Farrant; Gannal; Geoffroy; Haentsch; Heurck, van-; Hoyer; Jaeger; Langerhan; Lavdowsky; Lee; Noll; Ripart; Schultze; Squire; Stephenson; Suchannek; Vosseler.—NUTRIENT: Sachs.—PRESERVATIVE: Barff.—TYPHOID BACILLI: Stoddart.
Melanin.—Pollak.—In URINE: Eiselt; Jaksch, von-; Thormaehlen; Zeller.
Menthol.—Eykmann (thymol).—In OIL PEPPERMINT: Schimmel.
Mercuric Impregnation Mixture.—Cox.
Mercuro-Nitric Mixture.—Gilson.
Mercury.—Eschka; Fuerbringer; Gmelin-Smithson; Merget; Morgan; Teubner.—In ATMOSPHERE: Gaglio.—In URINE: Jolles; Ludwig.
Mesityl-quinone.—Fittig.
Metalbumin.—Hammarsten.
Metagelatin Vehicle.—Fol.
Metallic Salts.—Schmid.
Metals.—Cazeneuve; Deniges.
Meta-Vanadates.—Werther.

Methacetin.—Moers.
Methane.—Merget.
Methyl Alcohol.—Cazeneuve-Cotton; Jacquemart; Mulliken-Scudder.—In ALCOHOL: Langbeck; Rice-Bardy.
Methyl-Green Eosine Stain.—Calberla; List.
Methyl Mixture.—Schiefferdecker.
Methyl Orange.—Lunge; Miller.
Methyl Salicylates, natural and artificial.—Adrian.
Methyl-Violet Solution.—Koch; Kuehne.
Methyl-Violet Stain.—Orth.
Methylene Blue.—METHOD: Apathy; Bethe; Dogiel; Kuehne; Nissl; Rouget.—SOLUTION: Koch; Kuehne; Loeffler.—STAIN: Dogiel; Koch; Parker.
Methylene-Blue Eosine Stain.—Chenzinsky; Pianese.
Methylene-Blue Borax.—Sahli.
Michrochemical Reagent.—Lutz.
Micro-Preservative Solution.—Keiser.
Micro-Sections.—HARDENING FLUID for: Bunger.—STAINS for: Genfer; Gram-Gunther; Hanstein.
Microscopical Examination of Blood.—Hayem.
Migranin.—Strobel.
Milk.—Adams (fat); Carcano (boiled and unboiled); Hehner (formaldehyde); Hosaeus (borax; sodium bicarbonate); Leffmann-Beam (fat); Lythgoe (aniline orange); Medicus (salicylic acid); Schaeffer (boiled and unboiled); Vaudin; Werner-Schmidt (fat).
Milk Sugar.—Conrady; Rubner.
Mineral Acids.—Bergman; Flueckiger; Hager; Huber; Hume; Kieffer; Mohr; Rheoch; Spence-Esilmann.—In ORGANIC ACIDS: Nickel.—In VINEGAR: Ashby; Chiappe; Griggi; Hehner; Jorissen; Mallet; Strohl; Wharton; Witz.
Mineral Oils.—Lux; Wiederhold.
Mineral Substances in Flour.—Himly.
Mineral Waters, Organic Matter in.—Garrigou.
Minerals.—Klein; Thoulet.
Moisture.—Merget.
Molybdenum.—Maschke.
Molybdic Acid.—Braun; Kobell; Schoenn; Siewert.
Monatomic Alcohols.—Bitto.

Morphine.—Fairthorne; Grove; Horsley; Husemann; Jassoy; Jorissen; Kalkbrenner; Kieffer; Kobert; Kotzebue; Lamal; Lefort; Lindo; Loof; Marquis; Mecke; Melzer; Nadler; Otto; Robin; Robinet; Robiquet; Schneider; Selmi; Serullas; Siebold; Tattersall; Thomas; Vitali; Wangerin; Wellcome; Wender; Weppen; Woolsey.—In QUININE SULPHATE: Hesse.—In URINE: Landsberg-Wislicenus.

Motor Activity of Stomach.—Siewer.

Mounting Medium.—Apathy; Beale; Gannal; Geoffroy; Heurck, van-; Hoyer; Ripart; Schultze; Stephenson; Suchannek; Weigert.

Mounting Process, Gelatin.—Alleger.

Mounting, Slow or Exposure.—Cole.

Mucicarmine for Staining Mucus.—Mayer.

Mucihematein for Staining Mucus.—Mayer.

Mucilage, Quince.—Born-Wieger.

Mucin in Urine.—Salkowsky-Leubes.

Musk.—Berzelius.

Mustard, Turmeric in.—Wilder.

Mustard Oil, Carbon Disulphide in.—Luck.

Myrrh.—Bonastre; Righini.—BISABOL and HERABOL: Tucholka.

Naphtalin.—Edlefsen; Penzoldt; Thoms.

Naphtol.—ALPHA: Aymonier; Leger.—BETA: Leger.

Naphtols.—Flueckiger; Lustgarten; Richardson; Thoms; Wolf.

Naphtol Yellow.—In PASTRY: Schaefer.—In URINE: Vitali.

Narceine.—Arnold; Dragendorff; Mecke; Melzer; Stein; Vogel.

Narcotine.—Couerbe; Elias; Mecke; Melzer; Robin.

Narcotization.—METHOD: Foettinger; Fol; Korotnoff; Redenbaugh; Tullberg; Verworn.—SOLUTION: Bianco; Hofer.

Nataloin.—Histed.

Natural Injections.—Zellner.

Nerve-Centre Stain.—Adamkiewicz.

Nerve Stain.—Alt; Henle; Kaiser; Kultschitzky; Lewis, Bevan-; Magini; Mann; Nissl; Rehm; Sahli; Sankey; Schmans; Von Marchi; Wolter.

Neuroglia Stain.—Weigert.

Neurological Method.—Bellonci; Kallins.

Nickel.—Braun; Deniges; Papasogli.
Nicotine.—Heut; Mecke; Melzer; Palm; Schindelmeiser; Wender.
Nitrates.—Allesandri-Guaceni; Deniges; Grimaux; Jean-Alvarez; Lindo; Spiegel.—In WATER: Cazeneuve-Defournel.
Nitric Acid.—Allesandri-Guaceni; Altman; Austen-Chamberlain; Bailey; Boettger; Bolas; Boussingalt; Broun; Desbassin; Hager (iodic acid); Hilger (iodic acid); Horsley; Kammerer; Kersting; Kopp; Lindo; Longi; Lunge-Lwoff; Martin; Nicholson; Piccini; Reichardt; Richmond; Schmidt; Sprengel; Stein; Tassini-Piazza; Uffelmann; Vogel.—In URINE: Schoenbein; Schulze; Weyl.
Nitrites.—Bujwid; Deniges; Deventer; Fresenius; Greenwalt; Lindo; Pichard; Riegler; Sabatier; Schaefer.
Nitrobenzene.—Bechampo; Bourgoin; Brunner; Debrunner; Dragendorff; Jacquemin; Morpurgo.—In ESSENTIAL OIL. ALMOND: Hager; Henninger; Maisch; Pegna.
Nitro-Glycerin.—Mohr; Werber.
Nitrogen.—Donath; Kjeldahl; Knop.—In URINE: Allen.
Nitrogenous Compounds, Organic.—Lassaigne.
Nitrophenol.—Langbeck.
Nitroso Compounds.—Liebermann.
Nitrous Acid.—Boettger; Chatard; Frankland; Fresenius; Griess; Griess-Ilosvay; Hager; Jorrisen; Kammerer; Kopp; Lunge-Lwoff; Meldola; Plugge; Rideal-Green; Schoenbein; Schuyten; Trommsdorff; Wilson.—In BLOOD: Bertoni-Raymondi.—In URINE: Schoenbein.—In WATER: Maschke.
Nitrous Ether, Water in.—Lloyd.
Nucleo Albumins.—Just (iron).—In URINE: Reissner.
Nutrient Medium.—Sachs.
Nux Vomica.—Schlienkamp.—ASSAY: Dunstan-Short.
Oil, Almond, Expressed.—Bieber.
Oil, Almond, Essential, Nitrobenzene in.—Hager; Henninger; Maisch; Pegna.
Oil Anise.—FREEZING MASS: Kuehne.—IMBEDDING PROCESS: Moore.
Oil Bergamot, Oil Turpentine in.—Gulli.
Oil Cacao.—Filsinger.
Oil Cajuput, Cineol in.—Faulding.

Oil Cassia.—Hirschsohn.
Oil Castor.—Bollet; Draper; Finkener; Di Vetere.—In COPAIVA: Hager; Maupy.—In CROTON OIL: Maupy.—In OLIVE OIL: Leonardi.
Oil Cedarwood.—In SPEARMINT OIL: Kremers-Schreiner.
Oil Clove, Phenol in.—Flueckiger.
Oil Copaiva.—In URINE: Nobel.
Oil, Coriander.—Schimmel.
Oil Cottonseed.—Bechi; Deiss; Halphen; Hirschsohn; Labiche; Millian; Ruggieri-Tortelli; Wolfbauer.—In LARD: Conroy; Gantter.—In OLIVE OIL: Brulle; Hauchecorne; Heydenreich.
Oil Croton.—Maisch; Maupy (castor oil).—In TINCTURE IODINE: Durien.
Oil Eucalyptus, Cineol in.—Faulding.
Oil, Fusel.—Betelli; Vitali.
Oil Gurjun.—Flueckiger.—In COPAIVA: Enell.
Oil Lemon.—Schimmel.
Oil Linseed.—Morrell.
Oil Olive.—Boudet; Bradford; Brulle (foreign oils); Buchheister; Codina-Laenglin; Conroy; Diesel; Hauchecorne (cottonseed oil); Kopp; Laillier; Leonardi (castor oil); Lipowitz; Marchand; Merz; Schneider (cruciferous oils); Wimmer; Zechini.
Oil, Peach Kernel.—Bieber.
Oil Peanut.—Renard; Souchere.
Oil Peppermint.—Arzberger; Flueckiger; Jehn; Schack; Schimmel.
Oil Rose.—Ganswindt; Guibourt.
Oil Rose-Geranium.—Jaillard.
Oil Rosin.—Storch-Morawski.—In OIL MIXTURES: Storch.
Oil, Sandal.—Hendrix.
Oil, Sesame.—Basoletto; Baudowin; Breinl; Bremer; Camoin; Carlinfanti; Fabris-Villavecchia; Flueckiger-Behren; Gassend; Lewin; Soltsiens; Tambon; Tocher.
Oil Spearmint.—Schreiner-Kremers.
Oil Turpentine.—Vogel.—In OIL BERGAMOT: Gulli.
Oil Valerian.—Flueckiger.
Oil Mixtures, Rosin Oil in.—Storch.
Oiled Wheat.—Himly.

Oils.—Cailletet (copper); Huebl; Jean; Maumené; Penot; Schoenvogel; Schramm; Wemince.—CRUCIFEROUS: Grehant; Miahle.—ESSENTIAL: Barbier (alcohol); Crismer (turpentine); Dragendorff (alcohol); Elram; Flueckiger; Forney (alcohol); Hager (alcohol; chloroform); Hoppe; Leonardi (alcohol); Leuch (Water); McClellan-Forney (alcohol; turpentine); Maier (turpentine); Maisch; Oberdoerffer (alcohol); Perrot; Puscher (alcohol); Redwood (alcohol); Stuart (alcohol): Sulzer (alcohol); Tuchen; Walz (fixed oils).—FATTY: Barbot; Behrens; Bieber; Bourdat; Cailletet; Calvert; Crace-Calvert; Glaessner; Hager; Heidenreich; Jacobsen; Livache; Massie; Merz; Nickles; Poutet; Roth; Royere, de la-.—MINERAL: Wiederhold.—ROSIN: Wiederhold.—In COPAIVA: Gerber; Hager; Hirschsohn; Muter; Lux.

Olive Oil.—Boudet; Bradford; Brulle (foreign oils); Buchheister; Codina-Laenglin; Conroy; Di Vetere (castor oil); Diessel; Hauchecorne (cottonseed oil); Heydenreich (cottonseed oil); Kopp; Laillier; Leonardi (castor oil); Lipowitz; Marchand; Merz; Millian (linseed oil); Schneider (foreign oils); Wimmer; Zechini.

One-Third Alcohol.—Ranvier.

Opium.—Brissemoret (alkaloids of); Everitt; Merck; O'Shaughnessy; Southey.

Orange Method.—Flemming.

Orcein Stain.—Israel.

Orchella Stain.—Wedl.

Organic Acids.—Geogehan; Nickel (mineral acids); Pinerna.—In PHENOL: Bachmeier.

Organic Matter.—Lassaigne.—In WATER: Dupasquier; Garrigou; Marchand.

Orseille Stain.—Wedl.

Osmic Acid.—METHOD: Azoulay; Bristol; Mann; Overton; Ranvier-Vignal.—STAINS: Kolossow; Lee; Mährenthal, von-; Pal-Exner.

Ova, Examination Liquid for.—Henking.

Oxalic Acid.—Salkowsky.—SOLUTION: Boccardi.—In URINE: Reoch.

Oxalic-Acid Carmine.—Thiersch.

Oxalic-Acid Indigo-Carmine.—Thiersch.

Oxygen Process.—Tidy.
Ozone.—Boettger; Chlopin; Houzeau (test paper); Merget; Schoenbein (test paper); Wurster ("tetra" paper).
Palladium-Iodide Stain.—Paladino.
Papaverine.—Anderson; Mecke; Melzer; Tattersall; Wender.
Paper.—Dahlmann; Friedlander (wood fibre); Geissler (albumin test-); Griess (test-); Herzberg; Houzeau (ozone test-); Wolesky (wood fibre).
Paracarmine.—Mayer.
Para-Amidophenetol in Phenacetin.—Reuter.
Para-cresol.—Jaksch, Von-.
Paraffin.—Spee, Graf.—MASS: Van Walsem.—In WAX: Estcourt-Parry; Landott.
Paranitrophenol.—Spiegel.
Paraoxyphenylacetic Acid.—Millon.
Paratoliudine.—Lauth; Rosenstiehl.
Paraxanthin.—Salomon.
Peanut Oil.—Renard; Souchere.
Peach-Kernel Oil.—Bieber.
Peas, Preserved, Copper in.—Nikitin.
Pentose.—Bial; Tollens.
Pelagic Animals, fixing delicate.—Bedot.
Peppermint Oil.—Arzberger; Flueckiger; Jehn; Schack.
Pepsin.—Langley.
Pepsinogen.—Langley.
Peptones.—Bogomolow-Wassilieff; Devoto; Gorup-Besanez; Hofmeister; Riegler.—In URINE: Jaworowski; Martin; Posner; Ralfe; Randolph; Salkowsky.
Permanganate Method.—Henneguy.
Permanganate Solutions, Standardizing.—Stolba.
Peronin.—Kobert.
Peroxides.—Dudderidge.
Peru Balsam.—Gawalowski (alcohol); Gehe; Hager (benzoin); Hirschsohn.
Petrolatum, Animal and Vegetable Fats in.—Crouzel-Dupin.
Petroleum.—Bird; Holde.
Phenacetin.—Autenrieth-Hinsberg; Gigli; Hirschsohn (acetanilid); Moers; Reuter (para-amidophenetol); Ritsert; Schroeder (acetanilid); Strobel.

Phenacetolin.—Degener; Lunge.
Phenetidin in Urine.—Edlefsen.
Phenol.—Allen; Almén; Bachmeier (organic acids); Berthelot; Clarke; Cotton; Davy; Deville; Eykmann; Fiora; Flueckiger; Frisch; Fresenius; Hirsch; Hoffmann; Hoppe-Seyler; Jacquemin; Klunge; Landolt; Lex; Liebermann; Lindo; Maseau; Mene; Millon; Morson; Neubauer; Penzoldt-Fischer; Plugge; Pollacci; Salkowsky.—In URINE: Dragendorff.
Phenols.—Candussio; Chapman; Defacqz; Hoffmann; Lowe; Orlow; Thoms.
Phenolphtalein.—Luck.
Phloroglucin.—Thoms; Weselsky.—MIXTURE: Ferreri.
Phosphoric Acid.—Bunsen; Fourcroy; Gilbert; Merz; Pagel; Ross; Selmi; Svanberg.
Phosphorus.—Fresenius-Neubauer; Hager; Mitscherlich; Mukerji; Scherer; Schiff; Schoenn; Woehler.—In IRON: Fairbank.—In ORGANIC MATTER: Lipowitz.—In PHOSPHORIC ACID: Pagel.—In TISSUES: Bastelaer; Dusart-Blondlot.
Phosphorus Hydride.—Hager.
Phosphotungstic Acid for Alkaloids.—Schering.
Phyllocyanin.—Pellagri.
Physostigmine.—Mecke; Petti.
Picric Acid.—Brunner; Pohl.—In BEER: Rupeau.
Picric Alcohol.—Gage.
Picro-Carmine.—Ranvier; Squire; Vignal-Ranvier; Weigert.—METHOD: Cole.
Picro-Chromic Acid.—METHOD: Fol.—SOLUTION: Haensel.
Picro-Hydrochloric Acid.—Mayer.
Picro-Nigrosin Stain.—Freeborn; Martinotti.
Picro-Nitric Acid.—Mayer.
Picro-Osmic Acid.—Vom Rath.
Picro-Platinic Mixture.—Vom Rath.
Picro-Platinic-Osmic Mixture.—Vom Rath.
Picro-Sublimate Mixture.—Rabl; Vom Rath.
Picro-Sublimate-Osmic Mixture.—Vom Rath.
Picro-Sulphuric Acid.—Kleinenberg; Mayer.
Picro-tannin Mixtures.—Mann.
Picrotoxin.—Becker; Duflos; Mecke; Melzer; Minovici; Oglialoro; Otto; Palm.

Pigments, Biliary.—Barral; Bartley; Basham; Bruecke; Casali; Capranika; Dumontpallier; Dumontpallier-Trousseau; Dragendorff; Deubner; Fleischl; Gerard; Gerhardt; Heller; Hilger; Hoppe-Seyler; Huppert; Jolles; Krehbiel; Lewin; Maréchal; Neukomm; Noel; Paul; Penzoldt; Riegler; Rosenbach; Rosin; Schwanda; Smith; Triollet; Tiedemann-Gmelin; Ultzmann; Vitali; Yvon.

Pigments, Wine.—Nessler.

Pilocarpine.—Helch; Lenz; Nagelvoort.

Plasma Cells, Staining Method for.—Bergonzini.

Platino-Aceto-Osmic Mixture.—Hermann.

Platino-Sublimate Mixture.—Rabl.

Platinum.—Fischer.—FIXING SOLUTION: Rabl.—HARDENING MIXTURE: Johnson.

Platinum Chloride.—Merkel.

Podophyllum Resin.—Millard.

Polka-Paper.—Schott.

Pomegranate-Root Bark.—Kühl.

Potash Preparations, Preservative for.—Gage.

Potassa Solution.—Moleschott.

Potassio-Ferric Tartrate.—Griggi.

Potassio-Mercuric Iodide Solution.—Masin; Mayer.

Potassium.—Erdmann; Konick, de-; Woerner.—ACETATE (solution): Squire.—BICHROMATE: Donath.—CHROMATE: Donath; Ludwig.—CYANATE: Schneider.—IODIDE: Lepage.—PERMANGANATE (solution): Mohr.—PICRAMATE: Frebault.—PLATINIC-CHLORIDE (reagent): Schwarzenbach-Delff.—SALTS: Campani; Curtman; Mohr; Stolba.—In URINE: Heintz; Salkowsky.

Precipitates, Soluble.—Borodin.

Preservative Fluid.—Barff; Flemming; Gage; Gilson; Glage; Goadby (or Godbay); Harting; Keiser; Pacini; Pick; Ripart-Pettit; Thwaite; Wickersheimer.

Primary Amines.—Hoffmann.

Proteids.—Bruecke; Mandel; Michailow; Petri; Piotrowski; Rideal-Stewart.

Protein.—Ritthausen; Sonnenschein.

Proximate Principles.—Johannson.

Prussian-Blue.—GLYCERIN MASS: Beale; Robins.—INJECTION: Leber; Ranvier; Thiersch.
Ptomaines.—Brouardel-Boutmy; Trotarelli.
Pus.—Day.—In URINE: Donne.
Pyridine.—Anderson.—For HARDENING: Souza, de-.
Pyrocatechin.—Brieger; Mueller-Ebstein.—In URINE: Mueller-Ebstein; Neubauer.
Pyrogallol.—Griggi; Mathieu-Plessy; Watson.—Stain: Lee; Mährenthal, von-.
Pyroligneous Matter in Acetic Acid.—Lightfoot.
Pyrophosphoric Acid in Urine.—Joly-Pacquelin.
Quinamine.—Oudemans.
Quince Mucilage.—Born-Wieger.
Quinidine.—Hesse; Hirschsohn.
Quinine.—André; Blaise; Creuse (salicin); De Vrij; Flueckiger; Glenard; Hager; Heyninger, van-; Hesse (allied alkaloids); Kerner; Kletzinski; Kubli; Leers; Leube; Liebig; Maisch; Mecke; Pelletier; Robin; Schwabe; Vogel; Vrij, de-; Wender; Zeller.—In URINE: Binz; Kerner; Vitali.—SULPHATE: Hesse (morphine); Paul (cinchonidine); Schaefer.
Quinoline.—Anderson.
Raspberry Syrup, Cherry Syrup in.—Windisch.
Reagent.—Faktor; White.
Red Injection Fluid.—Bruecke.
Red Wine, Coloring Matters of.—Boettger.
Reduced Iron.—Fuge.
Reducing Solution.—Pritchard.
Regenerating Osmic-Acid Solutions.—Bristol.
Regenerating Weigert's Hematoxylin.—Berlinerblau.
Rennet, Zymogen of.—Klemperer.
Resazurin.—Crismer.
Resin in Wax.—Donath; Donath-Schmidt; Estcourt-Parry.
Resin.—Elram; Hehn; Unverdorben-Franchimont; Storch-Morawski.—In WAX: Schmidt-Donath.—PODOPHYLLUM: Millard. See also ROSIN.
Resorcin.—Bodde; Ferraro; Thoms.
Rhubarb.—Maisch (turmeric); Opwyrda (turmeric); Wilder (turmeric).—In URINE: Proksch.
Rose Oil.—Ganswindt; Guibourt.

Rose-Geranium Oil.—Jaillard.
Rosin.—In BALSAM TOLU: Hirschsohn.—In GUAIAC RESIN: Hirschsohn.
Rosin Oil.—Storch-Morawski; Wiederhold.—In OIL MIXTURES: Storch.
Rotifiers.—Rousselet.
Rubidium.—Erdmann.
Rum, Genuine.—Wiederholt.
Rye-Flour, Ergot in.—Boettger.
Rye Flour.—Wittmack.
Sabadilline.—Wender.
Saccharin.—Boernstein; Bornstein; Hairs; Kayser; Leys; Lindemann-Motten; Lindo; Remsen; Schmidt; Spica.
Saffrol.—Chapman.
Safranine.—Boettger; Martinotti-Resegotti.—SOLUTION: Bates; Flemming.—STAIN: Babes; Foa; Pfitzner; Podwysotzki; Resegotti-Martinotti; Szobolew; Zwaardemaker.
Salicin.—Robin.—In QUININE: Creuse.
Salicylic Acid.—Almén; Hager; Jorissen; Lindemann-Motten; Millon; Phipson; Ridenour; Schulze; Thoms.—In MILK: Medicus.—In URINE: Robinet; Siebold-Bradbury.—In WINE: Spicea.
Salicylic Vinegar.—Meyer.
Salicylic Vinegar and Gum Medium.—Noll.
Salipyrine.—Strobel.
Saliva, Iodides in.—Bourget.
Salol.—Strobel.
Salophen.—Goldmann; Reutmann.
Salt Solution.—Carnoy.
Sandal Oil.—Hendrix.
Sandarac Medium.—Lavdowsky.
Sanguinarine.—Orlow-Horst.
Santonica.—Astolfi.
Santonin.—Ferraro; Hager; Lindo; Pain; Schermer; Smith.—In URINE: Crouzel; Hoppe-Seyler.
Sausage, Decomposed.—Eber.
Scammony.—Buchner.
Scheele's-Green Coloring Mass.—Robins.
Serial Sections.—Poli; Rabl; Schaellibaum.

Serum.—ARTIFICIAL: Kronecker; Frey (iodized).—CHOLERA REACTION: Pfeiffer.—IODIZED: Ranvier.
Serum Paper.—Richardson.
Sesame Oil.—Basoletto; Baudouin; Bremer; Breinl; Camoin; Carlinfanti; Fabris-Villavecchia; Flueckiger-Behren; Gassend; Lewin; Soltsiens; Tambon.—In OTHER OILS: Tocher.
Sesquiterpenes.—Wallach.
Shellac Fixative.—Giesbrecht; Mayer.
Shellac Injection Mass.—Hoyer.
Shellac Method for Hard, Chitinous Objects.—Hyatt.
Shikimi Fruit in Star Anise.—Lenz.
Silicic Acid.—Barfoed.
Silk.—Hoehnel, Von-; Jacquemin; Lidof; Liebermann; Peltier.
Silver.—In LEAD ORE: Krutwig.—STAIN: Alferow; Hoyer; Mueller; Jakimovitch; Oppitz; Renaut; Robinski; Rouget; Sattler; Tartuferi; Tourneux-Hermann.
Silver Bromide, Chloride, and Iodide.—Volhard.
Silver Nitrate.—GELATIN MASS: Hoyer.—INJECTION: Ranvier.—SOLUTION: Wanklyn.
Skatol.—Ciamician-Magnanini.
Slide Cleaning Solution.—Fol; Hanaman; James; Knauer; Nias.
Smegma Bacillus Stain.—Housell.
Soap.—IMBEDDING MASS: Fischer.—SOLUTION: Clark; Wanklyn.—In LUBRICATING OILS: Schweitzer.
Soda Preparations, Preservative for.—Gage.
Soda Solution.—Moleschott.
Sodium Bicarbonate in Milk.—Hosaeus.
Sodium Carbonate.—Biltz.
Sodium Chloride and Alcohol.—Moleschott-Piso-Borme.
Sodium-Hypochlorite Solution.—Labarraque; Noll.
Sodium in Lithium Carbonate.—Symons.
Sodium Picramate.—Frebault.
Sodium Salts.—Hager; Streng.
Soil, Excrement in.—Finkelbury.
Solanine.—Bach; Bauer; Clarus; Dragendorff; Helwig; Mecke.
Soluble Precipitates.—Borodin.
Solution.—Hayem (hypodermoclysis); Huebl; Loeffler; Melassez (for hemin crystals); Prollius.—ALKALINE-PERMANGANATE: Wanklyn.—AMMONIUM-CHLORIDE: Wanklyn.—ANILINE:

Kuehne.—CARMINE: Hamann.—CARMINE-ALUM: Grenacher.—CELLOIDIN: Busse; Elsching.—CHLORAL-HYDRATE: Munson.—CULTURE: Cohn; Zune.—DAMMAR: Pfitzner.—DECALCIFICATION: Haug.—DIPHENYLAMINE-SULPHATE: Kopp; Pollet.—FIXING: Altmann; Carter; Eisig; Flemming; Fol; Hayem; Kollmann; Kultchitzky; Zencker.—FORMALDEHYDE: Hermann; Lavdowsky; Lee.—FORMIC-ACID: Boccardi.—FUCHSINE: Frey.—GENTIAN-VIOLET: Ehrlich.—HARDENING: Blum; Carnoy; Flemming; Remak.—HEMATEIN: Hansen.—IODINE: Gram; Huebl-Waller.—IODINE-POTASSIUM-IODIDE: Wagner-Fresenius.—IRON-SUBSULPHATE: Monsel.—MAGNESIUM-HYPOCHLORITE: Ramsay.—MANGANESE-CHLORIDE: Pictet.—METHYL-VIOLET: Koch; Kuehne.—METHYLENE-BLUE: Koch.—MICRO-PRESERVATIVE: Keiser.—NARCOTIZATION: Hofer.—OSMIC-ACID: Bristol.—OXALIC ACID: Boccardi.—PICRO-CHROMIC ACID: Haensel.—PLATINIC-CHLORIDE: Rabl.—POTASSA: Moleschott.—POTASSIO-MERCURIC IODIDE: Masin; Mayer.—POTASSIUM-ACETATE: Squire.—POTASSIUM-PERMANGANATE: Mohr.—PRESERVATIVE: Glage; Pick.—SAFFRANINE: Bates; Flemming.—SALT: Carnoy.—SILVER-NITRATE: Wanklyn.—SLIDE-CLEANING: Fol; Hanaman.—SOAP: Clark; Wanklyn.—SODA: Moleschott.—SODIUM-CHLORIDE-ALCOHOL: Piso-Borme-Moleschott.—SODIUM-HYPOCHLORITE: Labarraque; Noll.—STARCH: Zulkowsky.—SUBLIMATE: Frenzel; Heidenhain; Keiser; Lee.—TANNIN: Carnoy.—TURPENTINE: Huehnefeld.—WASHING-SODA: Nias.

Sparteine.—Marque.

Spinal Chord Stain.—Kaiser.

Spirit Nitrous Ether.—Allen.

Spore Stain.—Ernst; Neisser; Neisser-Bienstock.

Stain.—ACTINOMYCOSIS: Weigert.—ALUM-PICRO-CARMINE: Legal.—AMMONIA-CARMINE: Hartig.—ANILINE: Hanstein.—BACTERIA: Blanchard; Ehrlich; Ermengen, van-; Ernst; Fischer; Gram; Gunther; Koch; Kuehne; Loeffler; Lugol; Schütz-Weigert; Weigert.—BENZOAZURIN: Martin.—BILBERRY-JUICE: Lavdowsky.—BLEU-DE-LYON: Baumgarten.—BLOOD: Ganther; Kastenbine; Moore; Rosenbach; Toison; Willeband; Wissowsky.—BLUE: Hoffmann.—BONE: Busch.—BRAIN: Weigert.—BISMARCK-BROWN: Kaiser; Maysel.—CELL-

NUCLEUS: Grenacher.—CHITIN: Bethe.—CHOLERA BACILLUS: Kuehne.—COMMA-BACILLUS: Bates.—CILIA: Ermengen, von-.—COCHINEAL: Mayer.—DAHLIA: Ehrlich.—DOUBLE: Benda; Gibbes; Kossinski; Seiler.—EMBRYO: Allen.—EPITHELIA: Jakobsohn.—FERRIC-CHLORIDE: Fol; Hoggan.—FIBRIN: Weigert.—FLAGELLA: Bunge; Crookshank; Hessert; Koch; Loeffler; Lutesch; Nicholle-Morax; Sclavo; Trenckmann; Von Ermengen.—FORMALDEHYDE: Ohlmacher.—FUCHSINE: Nissl. — FUCHSINE-METHYLENE BLUE: Baumgarten. — GENTIAN-VIOLET: Ehrlich; Nissen.—GOLD: Bastian; Hoyer; Underwood. — GOLD-SUBLIMATE: Ziehen. — GONOCOCCI: Pick. — HEMATEIN: Rawitz. — HEMATOXYLIN: Apathy; Foa; Grenacher; Pal; Squire; Unna; Wolter.—HEMATOXYLIN-EOSINE: List. — INDULINE: Calberla. — IRON-PYROGALLATE: Roosevelt. — KERNSCHWARZ: Lee. — LEPROSY-BACILLI: Bates. — MAGENTA: Gibbes. — METHOD: Biondi; Berkley; Boettger; Brosicke; Ehrlich; Ehrlich-Biondi; Friedlander; Gaffky; Giacomi; Graser; Hermann-Boettger; Koch-Ehrlich; Lanz; Rabl; Paneth; Sterling. — METHYL-GREEN-EOSINE: List. — METHYLENE-BLUE: Dogiel; Koch. — METHYLENE-BLUE-EOSINE: Pianese.—MICRO-SECTION: Genfer; Gram-Gunther.—MUCICARMINE: Mayer.—MUCOHEMATEIN: Mayer.—NERVE: Alt; Henle; Kaiser; Kultschitzky; Lewis; Magini; Rehm; Sahli; Sankey; Schmans; Von Marchi.—NEUROGLIA: Weigert.—ORCEIN: Israel.—ORCHELLA: Wedl.—ORSEILLE: Wedl.—OSMIUM: Kolossow; Lee; Mährenthal, von-.—PALLADIUM-IODIDE: Paladine.—PICRO-NIGROSINE: Martinotti.—PLASMA-CELL: Berganzini.—PYROGALLOL: Lee; Mährenthal, von-.—SAFRANINE: Babes; Foa; Pfitzner; Podwyssotzki; Szobolew; Zwaardemaker.—SILVER: Alferow; Hoyer; Mueller; Oppitz; Robinski; Rouget; Sattler; Tourneux-Hermann.—SMOOTH-MUSCLE: Unna. — SPINAL-CHORD: Kaiser.—SPORE-BEARING BACILLI: Neisser.—SYPHILIS BACILLI: Doutrelepont-Schütz; Giacomi; Lewy; Lustgarten.—TUBERCLE BACILLI: Balmer-Fraenzel; Benysek; Gabbet; Gibbs; Koch; Pewsner-Nastinkow; Schultz; Ziehl-Neelsen. — TYPHUS-BACILLI: Kuehne.—VANADIUM: Wolter.

Stannous Chloride.—Rogers.

Star Anise, Shikimi Fruit in.—Lenz.

Starch.—Boettger (flour).—In CHOCOLATE: Wittstein.—In DRUGS and FOOD PRODUCTS: Lagerheim.—SOLUTION: Zulkowsky.
Stearin in Wax.—Escourt-Parry; Geith.
Strychnine.—Allen; Brieger; Davy; Dragendorff; Dunstan-Short; Hagen; Hager; Horsley; Landerer; Lefort; Lyon (mixture for extracting); Mack; Mandelin; Marchand; Mecke; Melzer; Orlow-Horst; Otto; Strychnine; Selmi; Slater; Tafel; Thomas; Vitali; Wender.—In URINE: Schultzen.
Sublimate.—METHOD: Golgi.—SOLUTION: Fraenzel; Heidenhain; Keiser; Lee; Van Beneden.
Sublimate and Gold Stain.—Ziehen.
Succinic Acid.—Neuberg; Papasogli-Poli.
Sucrol.—Morpurgo; Wender.
Sugar.—Gentele; Mathieu-Plessy; Pettenkofer; Vidan; Villiers-Fayolle.—In GLYCERIN: Boettger; Hager.—In URINE: Arndt; Cappezuoli; Einhorn; Eschbaum; Fehling; Fiebig; Haines; Hoppe-Seyler; Jack; Jaksch, von-; Johnson; Kowarsky; Leismer; Moore; Oliver; Ost; Otto; Penzoldt; Piffard; Schreiber; Schwartz; Seegen; Tollman; Ventre-Pascha; Wender.
Sulfonal.—Ritsert; Schwarz; Strobel; Vulpius.
Sulphates in Urine.—Freund.
Sulphides.—Alvarez-Jean; Schott.
Sulphites.—Alvarez-Jean; Boedecker; Grant-Cohen.
Sulphocarbolates.—Prescott.
Sulphocarbonates.—Mermet.
Sulphocyanic Acid.—Colasanti; Kuelz; Munk.
Sulphocyanides.—Boettger.
Sulphur.—Bailey; Brunner; Gil; Schoenn; Vohl.—HYDRIDE: Caro; Fischer; Hager; Lauth.—In ILLUMINATING GAS: Wartha.
Sulphur Compounds in Petroleum.—Bird.
Sulphuretted Hydrogen.—Caro; Fischer; Hager; Lauth.
Sulphuric Acid.—Donath; Thresh; Vogel; Wormley.—In ALUMINIUM SULPHATE: Giesecke.—In VINEGAR: Nessler; Pollacci.—In WINE: Liebermann.
Sulphurous Acid.—Girardin; Kroupa; Reinsch; Schiff.—In URINE: Salkowsky.
Syntonin.—Kuehn.

Syphilis Bacilli, Staining. — Doutrelepont-Schütz; Giacomi; Lewy; Lustgarten.
Tannin.—Baemes; Gardiner; Gayard; Griessmayer; Griggi; Guyard; Hager; Oliver; Proctor; Saul; Seyda; Vogel; Watson; Young.—In DRUGS: Lutz.—IN WINE: Carlinfanti.—SOLUTION: Carnoy.
Tarry Matter.—Donath.—In AMMONIA: Kupferschlaeger; Wittstein.
Tarry Constituents of Lubricants Obtained from Petroleum.—Holde.
Tars, Differentiating.—Hirschsohn.
Tartaric Acid.—Cailletet; Chapman-Smith; Crismer; Fenton; Hager; Mohler; Pusch.—In WINE: Nessler.
Taurine.—Lang.
Tellurium.—Kerstal.
Terpenes.—Unverdorben-Fanchimont.
Test-Paper.—Boas; Boettger; Bourget; Chevreuil; Flueckiger; Geissler; Greenwalt; Griess; Guenzburg; Herzberg; Hoffmann; Houzeau; Kroupa; Lutke; Mann; Merget; Musculus; Oliver; Richardson; Schiff; Schoenbein; Schott; Selle; Stahl; Stevenin; Uffelmann; Weselsky; Wurster.
Textile Fabrics.—Lidoff; Liebermann; Maugin; Persoz; Schlossberger; Schweitzer.
Thalleioquin Reaction.—Brand; Hyde.
Thalline.—Jaksch, Von-; Kotzebue; Penzoldt; Skraup.
Thallium in Urine.—Marmé.
Thebaine.—Mecke; Melzer.
Theine.—Thompson.
Theobromine.—François; Treumann.
Thiophene.—Meyer.
Thiotolene.—Laubenheimer.
Thymol.—Hammarsten-Robbert; Thoms; Vitali.—In MENTHOL: Eykmann.
Tin.—Deniges; Dryer; Rideal; Rogers; Schmatolla.
Tincture Iodine, Croton Oil in.—Durien.
Tinfoil, Lead in.—Kopp.
Titanium.—Jackson; Lacroix; Weller.
Tolu Balsam, Rosin in.—Hirschsohn.
Tolu Cement.—Carnoy.

Toluene.—Thoms.
"Triacid" Mixture.—Ehrlich.
Trioxybenzene (Phloroglucin).—Thoms.
Tropaeolin.—Lunge; Miller.
Tropine.—Vreven.
Tubercle Bacilli Stain.—Balmer-Fraentzel; Baumgarten; Benysek; Frankel; Gabbet; Gabbet-Ernst; Gibbs; Koch; Koch-Ehrlich; Hermann; Kaatzer; Pewsner-Nastinkow; Pfuhl-Petri; Rindfleisch; Weichselbaum.
Turmeric.—In MUSTARD: Wilder.—In RHUBARB: Maisch; Opwyrda; Wilder.
Turpentine.—Dragendorff; Vogel.—CEMENT: Csoker (or Czoker); Parker.—COLOPHONY MOUNTING MEDIUM: Lee.—In COPAIVA: Hager.—In ESSENTIAL OILS: Crismer; Gulli; McClellan-Forney; Maier; Merz.—SOLUTION: Huehnefeld.
Typhoid and Cholera Bacillus Stain.—Kuehne.
Typhoid and Tubercle Bacilli, Diazo Reaction for.—Fredenwald-Ehrlich.
Typhoid Fever Bacilli, Extraneous Organisms Among.—Parietti.
Typhoid.—Richardson; Widal; Widal-Gruber.—MEDIUM: Stoddart.
Tyrosin.—Deniges; Frerich; Hoffmann; Piria; Piria-Staedeler; Scherer; Udransky; Wurster.
Tyrotoxicon.—Vaughn-Novy.
Unrolling Sections.—Duval.
Unsaponifiable Substances in Fats.—Holde.
Uranium.—Crolas-Ducker; Kern.
Uranium Acetate, Fixing Fluid.—Schenk.
Urates and Uric Acid.—Riegler.
Urea.—Bloxham; Bruecke; Claus; Davy-Leconte; Huefner; Liebig-Woehler; Luedy; Musculus; Schiff; Smith-Chapman; Udransky.
Uric Acid.—Archetti; Babo; Bayrac; Behier; Berlin; Bertrand; Deniges; Dieterich; Fokker; Hopkins; Jaksch, von-; Leconte; Magnier de la Source; Neubauer; Riegler; Schiff; Schulten-Wetzlar; Rudish-Boroschek; Schwanert; Source; Stadthagen. —In BLOOD: Garrod; Luff.—In URINARY CALCULI: Deniges.
Urinary Calculi, Uric Acid in.—Deniges.
Urinary Deposits.—Bohland.

Urine.—Abram (lead); Alpers (albumin); Allen (nitrogen); Anstie (alcohol); Arnold (aceto-acetic acid); Barfoed (glucose and lactose); Baumann (bacterial products; carbohydrates; glycerin); Bayer (acetone); Bayrac (uric acid); Binz (quinine); Bourget (iodides); Bremer (glucose); Bretet (glucose; levulose; saccharose); Bruecke (biliary pigments); Carter (indican); Chautard (acetone); Downe (pus); Dragendorff (phenol); Drewson (acetone); Ebstein-Muller (pyrocatechin); Edlefsen (chloric acid); phenetidin); Einhorn (sugar); Eiselt (melanin); Eschbaum (sugar); Eschbach-Gawalowsky (albumin); Francis (biliary acids); Frerich (leucin; tyrosin); Freund (sulphates); Gallois (inosite); Gawalowsky (albumin); Gerhardt (acetone); Grismer (glucose); Grocco (creatinine); Guerin (albumin); albuminoids); Hager (albumin); Hahnemann (copper; lead); Haines (sugar); Hammarsten (caffeine; indican; globulin); Harnack (iodine); Haslan (albumin); Heintz (potassium); Heller (albumin; indican; urophain); Heller-Teichmann (blood); Heynsius (albumin); Hindenlang (albumin); Hoppe-Seyler (sugar; santonin); Huehnefeld (blood); Ilimow (albumin); Jack (sugar); Jaffe (indican); Jaksch, von- (diacetic acid; melanin; sugar); Jakobsohn (epithelia); Jaworowsky (albumin; peptone); Johnson (sugar); Jolles (albumin; iodine; mercury); Joly-Pacquelin (pyrophosphoric acid); Kerner (quinine); Klett (indican); Kowarsky (sugar); Kuelz (sulphocyanic acid); Landsberg-Wislicenus (morphine); Latschenberger (ammonia); Lechini (blood); Leffmann; Legal (acetone) Leismer (sugar); Le Noble (acetone); Luchsinger (glycerin); Ludwig (mercury); Lugol (albumin); Mahomed (hemoglobin); Mai-Hilger (coloring); Marmé (cadmium; thallium); Martin (peptones); Millard (albumin); Moore (glucose; sugar); Mueller (hydrogen sulphide); Munk (hemapheinic; sulphocyanic acid); Neubauer (ammonia; chloroform); Newmann-Wender (glucose; hydroquinone; pyrocatechin); Nobel (copaiva; gurjun oil); Obermayer (indican); Ott (bilirubin); Pacquelin-Joly (pyrophosphoric acid); Patton (globulin); Piffard (sugar); Petri (kairin); Pollacci (albumin); Posner (albumin; peptone); Pratesi (glucose); Proescher (bilirubin); Proksch (rhubarb); Renzone (kairin); Quirini (glucose); Raabe (albumin); Rabuteau (bromic acid; chloric acid);

Rafaele (albumin); Ralfe (acetone; peptone); Randolph (peptones); Reichardt (arsenic); Reissner (nucleo-albumin); Rheoch (oxalic acid); Reynold (acetone); Reynold-Gunning (acetone); Roberts (albumin; glucose); Roberts-Stolnikoff albumin); Roch (albumin); Roman-Delluc (urobilin); Rosenbach (indigo-red); Rossel (blood); Ruber (glucose); Salkowsky (peptone; potassium; sulphurous acid); Salkowsky-Leubes (mucin); Sandlund (iodine); Schoenbein (nitric acid; nitrous acid); Schulz (nitric acid); Schwartz (sugar); Schwicker (acetone); Scivoletto (hydriodic acid); Scivolete (iodine); Senator-Lehmann (globulin); Siebold-Bradbury (salicylic acid); Stevenson (hemoglobin); Stillingfleet-Johnson (creatinine); Stock (acetone); Studenski (urobilin); Thormaehlin (melanin); Teichman-Heller (blood); Trétrop (albumin); Vitali (Martius' yellow; quinine); Weil-Gilbert (indican); Wender (sugar); Weyl (nitric acid); Wislicenus-Landsberg (morphine); Woodbury (alcohol); Yvon (acetanilid; antifebrin); Zeller (melanin); Zouchlos (albumin).

Urobilin in Urine.—Roman-Delluc; Studenski.

Urohematin.—Harley.

Urophaine in Urine.—Heller.

Valeraldehyde in Valerianic Acid.—Finzelberg.

Valerian Oil.—Flueckiger.

Valerianic Acid, Valeraldehyde in.—Finzelberg.

Vanadates, Meta.—Werther.

Vanadium and Gold Method.—Upson.

Vanadium Nerve Stain.—Wolter.

Vapors, Mercury, in Atmosphere.—Gaglio.

Varnish, Asphalt.—Kitton.

Varnish for Mounting Sections.—Weigert.

Vegetable Coloring Matter in Wine.—Hertz.

Vegetable Fats.—Allen; Schoenvogel; Welmann.—In PETROLATUM: Crouzel-Dupin.

Vegetable Fibers.—Frankenstein.

Venice-Turpentine Mounting Medium.—Vosseler.

Veratrine.—Ferraro; Mecke; Melzer; Robin; Schumpelitz; Trapp; Wender; Weppen.

Vinegar. — For CARAMEL: Crampton-Simons. — For COPPER: Hager. — For MINERAL ACIDS: Ashley; Chiappe; Griggi;

Hehner; Jorrissen; Mallet; Nessler; Pollacci; Strohl; Wharton; Witz.

Violet Ammonia-Carbolate.—Hermann.

Water.—Claus; Cavalli (alkalinity); Dupasquier (organic matter); Finkelburg (fecal matter); Fleck (ammonia); Gottstein (bacteria); Griess (fecal matter); Guldensteen (copper); Himly (illuminating gas); Cazeneuve-Defournel (nitrates); Marchand (organic matter); Maschke (nitrates).—ANILINE: Ehrlich-Weigert-Koch; Koch.—In ALCOHOL: Casoria; Debrunner; Mann; Winkler.—In BUTTER: Wibel.—In ETHER: Boettger; Mann; Napier; Romei.—In ESSENTIAL OILS: Leuchs.—In SPIRIT NITROUS ETHER: Lloyd.—POLLUTED: Causse.—POTABLE: Brantlecht; Hager.

Wax.—Donath (resin); Donath-Schmidt (resin); Estcourt-Parry (paraffin; resin; stearin); Geith; Hager.

Wax Feet.—Vosseler.

Wheat Flour.—Donny; Wittmack.

Wheat, Oiled.—Himly.

White-Lead Cement.—Kitton.

White-Lead Paper.—Schott.

Wine.—Arata (dyes); Brand (abrastol); Carpene (tannin); Cazeneuve (dyes); Dupré (dyes); Faure (dyes); Giessler (fuchsine); Girard (dyes); Heise (Kermes coloring matter); Liebermann (sulphurous acid); Nessler (citric acid; tartaric acid; pigments); Niviere-Hubert (fluorides); Pasteur-Wurtz (fuchsine); Pradines (fuchsine); Spicea (salicylic acid).

Woman's Milk.—Umikoff.

Wood Fiber in Paper.—Friedlander; Wolesky.

Wood Pulp.—Kaiser; Molesch.

Wool.—Jacquemin; Jandrier (cotton); Liebermann; Lidoff; Overbeck (cotton); Peltier.

Xanthin.—Hoppe-Seyler; Salomon; Simon; Strecker; Weidel.

Xanthoprotein.—Mulder.

Xylene.—Thoms.

Zinc.—Deniges; Gayard or Guyard (manganese); Rinman; Stahl.

Zymozen of Rennet.—Klemperer.