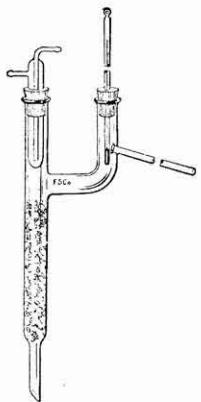


ABSTRACTS

APPARATUS, LABORATORY PRACTICE, AND DEMONSTRATIONS



DISTILLING COLUMN WITH COLD-SPOT CONDENSER AND INSET DELIVERY TUBE

made to determine the maximum efficiency in fractionating a mixture of 25 cc. of 95% ethyl alcohol and 25 cc. distilled water. Short glass tubes were found to be much more efficient than glass beads or glass wool as a packing for the bulbs. Most efficient recovery was obtained with the Wurtz tube in which the two lower bulbs were packed with glass tubes.

BYCK

A Laboratory Ozonizer. A. L. HENNE. *J. Am. Chem. Soc.*, 51, 2676-7 (Sept., 1929).—The paper describes a laboratory ozonizer, a simplified modification of one described previously by Smith [*J. Am. Chem. Soc.*, 47, 1844 (1925)].

Modifications eliminate mercury which makes apparatus heavy and liable to breakage, simplifies glass-blowing requirements, permits use of H_2SO_4 as electrode, and eliminates litharge joints. All of these improvements substantially decrease the cost. The figure is self-explanatory.

A lead wire dipping into dilute sulfuric acid is used as one electrode. The lead wire (six strands of fuse wire twisted together) remains straight and centered by its own weight so that sparking is prevented. As in Smith's, three tubes are sealed in series and immersed in water in a battery jar. The water is a second electrode and acts as a cooling bath. Since no mercury is used, the weight of the tubes is almost equal to the displaced water so that only the simplest support is needed to hold the tubes upright in the water bath. 10,000 volts is supplied across the electrodes from a $\frac{1}{4}$ -kw. transformer. Maximum cost is as follows. Transformer \$10, battery jar \$7, material and labor for three tubes \$10.

BYCK

It should be remembered that complete drying of the oxygen is an important feature. Yields of ozone at different rates of input of oxygen are 14, 8, 3% with oxygen rates of 4, 2, 100 liters per hr.

A Laboratory Balloon Inflator. H. WILLIAMS. *Neo-Chemion*, 3, 12-4 (Sept. and Dec., 1929).—In order to make a more lasting impression in the mind of the elementary student in some experiments on hydrogen, a demonstration of the lifting power of hydrogen-filled balloons was given. Ordinary toy rubber balloons were purchased and filled with hydrogen (prepared according to the standard experimental procedure) from a specially constructed inflator. A four-liter bottle is filled with hydrogen by displace-

Some New Technic in Fractionating. *Laboratory*, 3, 12 (1930).—Projecting the side arm into the distilling flask prevents heavy ends flowing from the side walls into the distillate. The use of a cold spot condenser (see Figure) permits temperature control at the top of the column; columns so equipped permit cuts to $\frac{1}{10}$ degree C.

H. H. K.

Close Fractions with the Lessing Contact Ring. *Laboratory*, 3, 13 (1930).—The rings have the advantage over glass beads

in that they expose greater surface; occupy less volume per unit; and have a free vapor space of 87%.

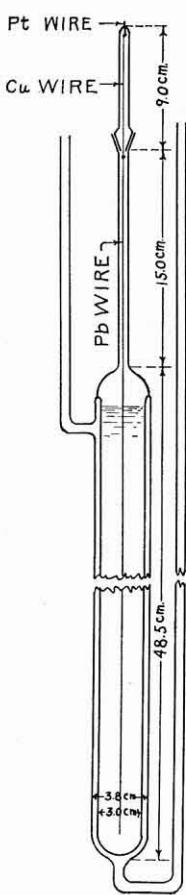
H. H. K.

The Wurtz Distilling Tube. O. L. BARIL. *Hormone*, 3, 117-8 (Nov., 1929).—A comparison between the Wurtz three-bulb distilling tube with various fillings, an ordinary distilling apparatus, and a Young four-pear still was



LESSING (NON-PACKING) CONTACT RINGS (1/4-INCH)

BYCK



ment of water. A two-hole rubber stopper is placed in the neck of the bottle, and a short glass tube passed through one hole. The balloon is fastened to the outer end of the tube. Through the other hole, a tube is passed leading to the bottom of the bottle. The other end of this tube is connected by rubber tubing to the laboratory water faucet. By turning on the water the hydrogen in the bottle is displaced with the rubber balloon under a pressure sufficient to overcome the elasticity of the balloon.

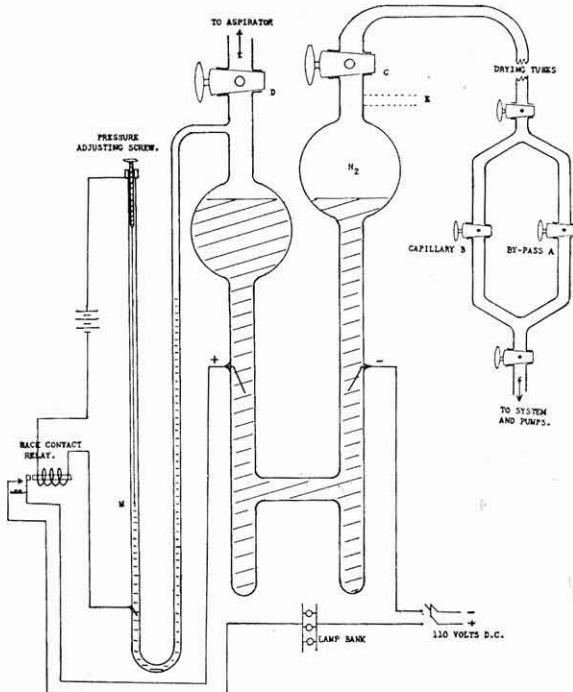
After tying the neck of the balloon and removing it from the glass tube from the bottle, a number of instructive experiments can be performed. The lifting power can be demonstrated, the balloon can be exploded by touching a candle to it, and numerous other phenomena can be strikingly demonstrated.

BYCK

An Arrangement for Obtaining a Steady Flow of Gas at a Constant Low Pressure.
F. G. SLACK. *Rev. Sci. Instruments* 1, 33-5 (Jan., 1930).—“Two bulbs of approxi-

mately one liter capacity are sealed to the top of an ordinary electrolytic gas generator. One of these is connected through a stopcock to a storage and drying tube, thence to the main system via a short capillary sealed in the stopcock *B*, by-passed with the line containing stopcock *A* which may be opened for convenience in pumping out the system. The second bulb, used as a reservoir for the gas not desired, is connected through a stopcock to an aspirator or pump which is used to draw off the accumulation of gas from time to time. Also between this bulb and stopcock is attached a mercury manometer tube to indicate and regulate the pressure in the generator. The mercury column at *M* opens or closes a relay contact to start or stop the generation of gas. The entire system is of soft glass with platinum seal-ins for the electrodes. The complete system is mounted on a board 9" by 60" with holes cut for bulbs and stopcocks.

“The operation of the device is as follows; after filling to about the levels as shown in the figure with dilute electrolyte the pressure is reduced by alternately using the main pumps through the by-pass *A*, and the aspirator. Finally with the pressure of 1 or 2 cc. of mercury the liquid is drawn up to the stopcock *C* which is then closed. The generator is started and allowed to operate until the H₂ bulb is filled with gas, the oxygen being drawn off with the aspirator, if necessary to keep the desired pressure. After washing out the system several times with gas, the by-pass *A* is closed and the gas allowed to flow through the capillary *B* into the system. *B* consists of a fine capillary sealed with DeKhotinsky cement into the stopcock plug. It is not difficult to adjust the size of the capillary since the pressure may easily be adjusted by the variation of the generator pressure. In practice a second capillary of somewhat larger diameter has been placed on the pump side of the system to reduce the pressure gradient through the system. With the pumps operating continuously the pressure in the main system could be



SCHEMATIC DIAGRAM OF APPARATUS FOR OBTAINING A STEADY FLOW OF HYDROGEN AT CONSTANT LOW PRESSURES

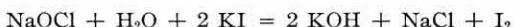
quickly adjusted to any desired pressure between 0.001 mm. and 1.0 mm. of Hg or to even higher pressures, by simply varying the pressure in the generator. This pressure is first set approximately by means of the aspirator and then controlled by the pressure adjusting screw consisting of a brass screw several inches long passing a threaded collar. On the end of the screw is welded a platinum wire extending to the surface of the mercury. Fine adjustments may be made by this screw by regulating the height of the mercury column which backs up to the low pressure in the generator. Care must be used in opening the cocks *C* and *D* that the pressure outside the generator is approximately the same as that inside, to avoid forcing the liquid too rapidly in either direction. In case it is desired to use a commercial gas, this may be admitted to the system at *E* by an electrically controlled reducing valve or in small quantities by hand." R. L. H.

Disposition of Waste Sodium. T. L. KELLY. *Hormone*, 3, 117 (Nov., 1929).—A method for the disposal of sodium waste, resulting from paring of the skin from pieces of the metal, is described. The sodium is thrown into a wide-mouth jar containing about $\frac{7}{8}$ kerosene and $\frac{1}{8}$ water. The sodium sinks in the kerosene until it strikes the interface between kerosene and water. The reaction liberates an amount of hydrogen which, adhering to the sodium, causes it to rise in the kerosene. After the hydrogen becomes discharged the sodium again sinks to the interface and the cycle is repeated. This method eliminates the use of alcohol and its subsequent recovery. It is a modification of the method for preparing carbonate free sodium hydroxide where in place of kerosene the distilled water is covered with a layer of ether, which excludes CO_2 and allows the metallic sodium to react with the water at a suitable and safe speed in the same way as in this method.

BYCK

A New Method of Detecting Bromine and Iodine in the Presence of Each Other. F. HARMS. *Z. physik. chem. Unterricht*, 42, 266 (Nov.-Dec., 1929).—The usual method for detecting iodine and bromine when they are both present is to precipitate the iodine by the addition of a little chlorine water, identifying it by shaking with carbon disulfide or carbon tetrachloride, oxidizing iodine to iodic acid by an excess of chlorine water and subsequent precipitation of bromine which can likewise be identified with the same organic solvents. The use of chlorine is not very pleasant on account of its odor. The following method seems to be better.

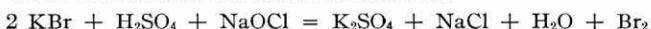
To the aqueous solution to be analyzed add a few drops of a solution of sodium hypochlorite which will liberate iodine but not bromine.



Identify the iodine, if any, by shaking with chloroform which will turn violet. If iodine was found to be present add an excess of the solution of sodium hypochlorite and shake; this will decolorize the chloroform solution due to the oxidation of iodine to iodic acid.



In order to detect bromine add now a little sulfuric acid.



If bromides are present the chloroform will turn brown on shaking.

L. S.

How to Be Economical with Aqueous Solutions of Hydrogen Sulfide Which Is Not Used Regularly. S. GENELIN. *Z. physik. chem. Unterricht*, 43, 29 (Jan.-Feb., 1930).—The preparation of aqueous solutions of hydrogen sulfide is not very pleasant. If this reagent is not used very frequently it is advisable to fill up the bottle completely with water whenever some of the solution has been taken out. The extent of dilution is much lower than the loss by oxidation in a flask containing air above the solution. L. S.

The Detection of Acetic Acid. D. KRUGER AND E. TSCHIRSCH. *Chem.-Ztg.*, 54, 42-4 (Jan. 11, 1930).—The various methods suggested in the literature can be classified in the following manner: I. *Detection by Means of an Odor:* Odor of acetic acid. Odor of ethyl acetate. Cacodyl reaction. II. *Color Reactions:* Red coloration with ferric chloride solutions; blue coloration with *o*-phthalaldehyde and ammonia. III. *The Benedict Method.* IV. *Indirect Method:* The detection as acetone. V. *Methods Based on the Insolubility of Certain Acetates*, particularly the microchemical methods based on characteristic crystalline forms of certain acetates.

The authors discuss all of these methods and state that the first four are not very trustworthy. They suggest the detection of acetic acid by means of the microchemical determination of sodium uranyl acetate. They claim that this reaction is more sensitive than most microchemical reactions of acetic acid. The other microchemical methods—detection as silver, mercurous, cupric, or lead acetate—are not very sensitive because of the relatively large solubility of the acetates.

L. S.

The Detection and Determination of Lead in Ethyl Gasoline. H. KIEMSTEDT. *Z. angew. Chem.*, **42**, 1107-8 (Nov. 30, 1929).—A number of suggestions have been made in the past: 1. Just acidify the gasoline with HCl and pass in H₂S. This method does not work at all. Lead triethyl chloride is formed and an ethyl group is split off which does not react with H₂S. 2. Remove the lead tetraethyl from the solution by subjecting the latter for several days to the action of sulfuric acid. The sulfur dioxide is absorbed by the lead tetraethyl with the formation of diethyl sulfonic acid and lead ethyl sulfinate. This method can be used but is not practical because of the length of time necessary. 3. Pass X-rays first through the solution and from there into an ionization chamber in which the air becomes more or less conducting depending upon the degree of adsorption. This method is interesting but it is an open question whether any other constituent of the gasoline would not seriously interfere with the results.

A simple method for the quick detection of lead is based on the instability of lead tetraethyl in the light. Subject ethyl gasoline to the sunlight or a mercury vapor lamp and it will soon become cloudy and gradually small flakes will separate out. These flakes consisting mainly of lead oxide are easily dissolved in dilute acetic acid from which it can be identified in the standard way. The radiation method can be modified thus: wet a piece of filter paper with ethyl gasoline and dry it under the rays of the mercury vapor lamp. Wet it with dilute acetic acid and develop the paper by exposing it to H₂S or treating it with (NH₄)₂S, whereby it is turned brownish black due to the formation of PbS. Instead of H₂S or (NH₄)₂S the paper can also be wetted with a dilute solution of KI by means of an atomizer, when the intensively yellow color of PbI₂ is produced. This test can be performed within a few minutes.

The following quantitative determination depends upon the reaction between lead tetraethyl and acetyl chloride in the presence of H₂O. The directions which have been worked out are as follows: Add 1 to 2 drops of H₂O and 2 to 3 cc. of acetyl chloride to 100 cc. of ethyl gasoline in a glass-stoppered, glass cylinder, shake, and let stand. The liquid becomes cloudy immediately; the red color changes to blue; voluminous white or light colored flakes precipitate. The decomposition of the lead tetraethyl is complete after 3 to 4 hours. Filter off the decolorized benzene. Collect the precipitate on a filter paper, wash several times with petroleum ether, dissolve the lead in dilute nitric acid and precipitate it in the known manner, *e. g.*, as a sulfate by evaporation with sulfuric acid.

Good checks can be obtained. An English product examined in the above manner showed 0.07 g. lead per 100 cc. of the ethyl gasoline having a specific gravity of 0.732 at 15° equivalent to 1.01 g. lead per kg. L. S.

The Uses of Sodium Thiosulfate in Analytical Chemistry. See this title on page 1197.

Quantitative Chemical Spectroscopy. *Laboratory*, **3**, 5-7 (1930).—The first of a series of articles which describes a spectrograph suitable for determining minor constituents in an analysis. H. H. K.

Gas Calorimeters. *Instruments*, **3**, 82-99 (Feb., 1930).—A description of the various types of gas calorimeters with illustrations. H. H. K.

Bomb Calorimeters. *Instruments*, **3**, 99-113 (Feb., 1930).—A description of the various types of bomb calorimeters with illustrations. H. H. K.

Calorimetry in America. See this title on page 1199. **Calorimetry, Its Importance and Practice in the Gas Industry.** See this title on page 1194.

Calorimetry. W. BLOCK. *Instruments*, **3**, 123-8 (Feb., 1930).—A brief elementary description of the methods used in determining heating values of various fuels. H. H. K.

TEACHING OBJECTIVES, METHODS, AND SUGGESTIONS

Arousing Interest in Chemistry. B. F. LAMONT. *High Sch. Teacher*, **6**, 56-7 (Feb., 1930).—Interest is essential to mastery. Results commensurate with the varied student abilities should be expected and such outcomes are only possible where there is interest.

As aids to interest—creation, project posters, simple analysis, science honor societies or clubs, writing of essays for the American Chemical Society prize essay contest and a more generous use of the library are submitted. Permission to participate in these privileges is conditioned upon better than average success in the regular work of the course. B. C. H.

The Project Method; Some Advantages and Disadvantages. R. C. PERRY. *High Sch. Teacher*, **6**, 59-60 (Feb., 1930).—Some of the 118 positive and negative qualities enumerated which may be of interest to teachers of chemistry include:

(1) the motor minded child benefits; (2) the child discovers what he can do; (3) observation is developed; (4) originality is encouraged; (5) ability to generalize is developed; (6) it teaches the assembly of data and facts; (7) material is discovered rather than taught; (8) the school becomes a laboratory rather than a lecture hall.

Some adverse characterizations are: (1) the project may become merely an object for display; (2) it is difficult to find and sometimes more difficult to procure materials; (3) excursions are hard to arrange with other teachers, parents, etc.

In general the advantages seem to lie mainly with the pupil and the disadvantages are to the curriculum and the administration. Again it may be said, "No one method will solve our educational problem." B. C. H.

Suggestions for Study Supervision. O. W. KOLBERG. *High Sch. Teacher*, 6, 79-80 (Feb., 1930).—From data from forty-four high schools of the North Central Association of Secondary Schools the author reports that 60% of them do not make any provision for study supervision by the teacher, that only 16% of the pupil's time is supervised, "the rest of it is left for him to use or waste as he sees fit" and that 84% of the schools emphasize quiet in preference to supervising study.

The usual practice is to have one teacher in charge of the study room, a different teacher for each successive period. This supervisor spends most of his time acting as a monitor with a chief interest in keeping order. It is more common to have all students studying in a large study hall with about 150 other students present than to have such study occur in the classroom under the class teacher.

His judgment is: "If we correctly evaluate the study time of pupils, we will provide just as carefully for its supervision as we do for the classroom. Study supervisors should be hired for their special aptitude in this line of work." B. C. H.

A Science Department and Motion Pictures. W. A. REDENBAUGH. *Educ. Screen*, 9, 6-7 (Jan., 1930).—An interesting story is told under the above title of how a well-organized science club not only "put science on the map" of that high school but purchased and paid for two projectors, one a 16-mm. machine and the other a 35-mm. machine.

The club has one general meeting per month with what might be called a science feature film shown each time. Such general programs are always followed up by a class discussion.

In addition to these main programs a large number of films, mostly 16 mm., are shown in the classrooms. A list of some of the films which have been found satisfactory for such use is presented and the method of their use in connection with the regular school work is described. B. C. H.

ADMINISTRATIVE PROBLEMS AND DEVICES; CURRICULA

A New Plan of Registration. C. E. SEASHORE. *J. Higher Educ.*, 1, 36-7 (Jan., 1930).—Describes briefly the plan of individual study for doctorate candidates at the State University of Iowa. H. H. K.

A New Executive Committee. E. H. WILKINS. *J. Higher Educ.*, 1, 37-8 (Jan., 1930).—At Oberlin College a faculty committee has been created to exercise the powers of the board of trustees in the interval between trustees' meetings, and to represent the faculty at these meetings. H. H. K.

Self-Education in Harvard College. A. L. LOWELL. *J. Higher Educ.*, 1, 65-72 (Feb., 1930).—A discussion of the Harvard scheme of self-education which combines the honor course, tutorial instruction, and reading periods. H. H. K.

KEEPING UP WITH CHEMISTRY

Practical Atomic Weights 1930. *Chem.-Ztg.*, 54, 52 (Jan. 15, 1930).—The German Atomic Weight Committee consists of M. Bodenstein, O. Hahn, O. Höningschmidt (*chairman*), and R. J. Meyer. The committee recently published its tenth report in which it was stated that the articles published from December, 1928, to November, 1929, did not justify any great change of the preceding table of Atomic Weights (*Chem.-Ztg.*, 53, 1929, p. 52). However, the element Rhenium, Re = 188.7, was added and the atomic weight of oxygen was given as 16.0000 on account of the atomic weight of hydrogen. L. S.

Calorimetry, Its Importance and Practice in the Gas Industry. W. E. STACKHOUSE. *Instruments*, 3, 77-81 (Feb., 1930).—A discussion of the fundamentals of calorimetry. H. H. K.

Chemistry in Incandescent Lamp Manufacture. W. J. BARTLETT. *Ind. Eng. Chem.*, 21, 970-2 (Oct., 1929).—In connection with the fiftieth anniversary of the discovery of the electric light by Edison, celebrated by the "Light's Golden Jubilee,"

this article from the Incandescent Lamp department of the General Electric Company on "Chemistry in Incandescent Lamp Manufacture" is of considerable interest. There are a number of interesting illustrations showing Edison at work in his laboratory, a fine photograph of Edison, and another of his restored laboratory, and an especially interesting chart of the pictorial history of artificial light. The subject matter deals briefly with problems in the industry where chemistry is of great importance and is presented under the headings (1) tungsten, (2) gases used for filling the bulbs, (3) getters for cleaning up residual gases in the bulb, (4) basing cements for cementing the glass part of the bulbs to the metal bases, (5) inside frosting, (6) coating for colored lamp.

BYCK

Chemical Warfare Service Saves Millions for Industry. R. S. SADTLER. *Chem. Met. Eng.*, 37, 88-90 (Feb., 1930); cf. THIS JOURNAL, 5, 1505-9 (Nov., 1928).—The Chemical Warfare Service has proved itself of value to America in peace time by important contributions to chemical science and industry of the nation as a whole. Among the more important of these is the development of compounds that will destroy the boll weevil more effectively than the calcium arsenate generally used. The service has demonstrated itself in the use of tear gas in controlling mobs; it has developed masks for protection against industrial fumes, and an efficient method for fumigating buildings. There have also been developed toxic ship bottom paints, protection for marine piling, and a better and safer method of fumigation of ships, all of which have proved valuable to the shipping industry.

R. L. H.

Fire-Proofing. ANON. *Silicate P's & Q's.*, 10 (Feb., 1930).—A silicate spray, or paint, has been found useful in reducing the fire hazard in bridge and mine timbers, and certain cloth fabrics. Danger of fires resulting from matches and cigarettes may be reduced by use of silicates. Many housewives may aid the family exchequer by purchase of a supply of eggs during the season when they are cheap, and preserving them with silicate.

H. T. B.

Fuels and Combustion. W. J. WOHLENBERG. *J. Eng. Educ.*, 20, 405-21 (Dec., 1929).—In 1926 the world at large was obtaining seventy-five per cent of its utilized energy from coal, sixteen per cent from oil and gas and less than nine per cent from water power.

In addition to its energy product coal should be looked upon as a storehouse of valuable materials. To utilize these depends upon the type of processing which coal is subjected to. Four such types of treatment are listed as: high-temperature carbonization, complete gasification as into producer and blue water gas, low-temperature carbonization and hydrogenation.

The first of these is carried on largely to meet the demand for metallurgical coke. By-products from this method are tar, gases, and ammonium sulfate. Low-temperature carbonization is used that less "cracking" may result. This process yields a more volatile coke, a gas of higher heat value but a lower output of ammonium sulfate.

Coal hydrogenation was developed by Doctor Bergius in Germany. Oil is the chief product of the treatment. The treatment is accomplished in two steps: in the first the coal is heated in an atmosphere of hydrogen, at from 300 to 350°C. This produces a pitch-like product which is subjected to the same hydrogen atmosphere but at the higher temperature of 450°C. This second reaction is virtually a "splitting" process which produces shorter-chain hydrocarbons.

The combustion engineer has the problem of designing a furnace which will secure a near approach to a 100 per cent release of the energy which the fuel can yield upon complete combustion. The factors involved in this aspect of combustion are: quantity of combustible space, free oxygen space, quantity of inert gases that have to be provided for, the diffusion and turbulence factor and the temperature of the mixture. Thus a process which, viewed superficially, seems to be rather simple, is in fact a succession of very complex transformations and involves not only the chemical transformation but many more factors which are less well understood.

B. C. H.

The World's Sugar Industry. ANON. *Chem. Age*, 22, 23-4 (Jan. 11, 1930).—A reproduction of parts of a Streatham Memorial Lecture delivered recently by Lewis Eynon. The article contains a brief history of the development of the cane sugar and beet sugar industries from early times to the present time. Sugar may be used in the future as a source of alcohol to be used as fuel. Four tons of sugar, a moderate yield for one acre of sugar cane, will yield 520 gallons of alcohol, enough to support two small cars for a year, each car traveling 7000 to 8000 miles.

E. R. W.

Organic Chemicals as Rubber Accelerators. *Syn. Org. Chem.*, 3, No. 3 (Feb., 1930).—A brief classification and discussion of the organic compounds useful for this purpose.

H. H. K.

Hot Plastic Shipbottom Paints. B. L. WERMHOFF, A. M. JORDON, AND H. C. KNIGHT. *Chem. Warfare*, **15**, 675-80 (Dec. 15, 1929).—Preliminary reports indicate that paints made up of rosin and various soaps of lead, mercury, and arsenic, with small amounts of turpentine or pine oil, when applied to ship bottoms in a hot, plastic condition will harden and protect the bottoms against the attachment of various marine organisms. These paints are more expensive than ordinary varnish paints but they will prevent fouling and corrosion for a greater length of time. This work has been carried out at Edgewood Arsenal. E. R. W.

Extraction of Helium from Monazite Sand. R. TAYLOR. *Chem. and Ind.*, **48**, 369T-372T (Dec. 27, 1929).—Monazite sand from Travancore, India, contains about 1 cc. of helium per g. of sand, the gas may be driven out by heating. Carbon dioxide is removed by washing with concentrated sodium hydroxide solution, and the nitrogen is removed by passing the gas over magnesium heated to about 600 degrees. Plant equipment for carrying this out on a commercial scale is described. E. R. W.

Copper Alloys Containing Silicon. ANON. *Chem. Age, Mo. Met. Sect.*, **22**, 1-2 (Jan. 4, 1930).—Silicon has been used in small amounts in copper alloys as a deoxidizer and as a hardener. When present to the extent of about 5%, silicon greatly increases the tensile strength of copper wire and cuts down its ductility, the electrical conductivity is lowered also. Special alloys containing copper, silicon, and manganese give castings which are easily worked and which are quite resistant to acid corrosion. E. R. W.

Producing Alumina by Acid and Electrothermal Processes. J. D. EDWARDS AND R. B. MASON. *Chem. and Met. Eng.*, **36**, 730-3 (Dec., 1929).—Search has been made for a commercial process of extraction of alumina from clay since clay may be found anywhere and at almost no cost. Clay, however, contains only 30% to 40% alumina as compared to 60% alumina in bauxite. The acid extraction process is recommended for those ores low in iron, for this eliminates the silicates which are invariably present. On the other hand the alkali extraction eliminates the iron which may be present. The ores are usually digested in 60% sulfuric acid, the aluminum sulfate collected and repurified. The alumina used for electrolytic reduction should not contain more than 0.05% Fe_2O_3 . The aluminum sulfate is collected in the solid form after purification, and decomposed into pure alumina by calcination for electrolytic reduction. The electrothermal process depends upon the reduction of the impurities to the metallic state, and then separating them from the pure alumina. R. L. H.

Aluminum Chloride's Debut. *Ind. Bull. A. D. Little, Inc.*, No. **36** (Dec., 1929).—Although the preparation of aluminum chloride was known as early as 1868, and numerous organic reactions in which aluminim chloride plays the important rôle were discovered in 1877 by Friedel and Crafts, only recently through the efforts of the Gulf Refining Company and McAfee, has it become one of the important industrial heavy chemicals. Its use in organic synthesis was early limited to preparation of costly substances since it was itself expensive. During the war it was used in preparation of toxic and tear gases. McAfee extended the reactions in which it was used to include the petroleum hydrocarbon and developed the process, named after him, for converting high-boiling petroleums into gasoline, using aluminum chloride. The cost when the process was first developed, was \$1.50 per pound and only after overcoming tremendous engineering difficulties was it possible to manufacture it at a cost of only 5¢ per pound. This reduction in price has made it possible to apply the Friedel-Crafts reaction in cases previously of insufficient importance to warrant the prohibitive cost, but which now become economically feasible. Dye bases, artificial perfumes, and certain drugs are prepared by synthesis involving the use of aluminum chloride.

The property of aluminum chloride which is the basis for all of these syntheses is its ability to form unstable reactive compounds with the hydrocarbons—these addition products are able to react in many ways impossible with the original hydrocarbon.

BYCK

Weather Proof Iron. *Ind. Bull. A. D. Little, Inc.*, No. **36** (Dec., 1929).—A recent outstanding development in ferrous alloys is a class known as chrome-nickel iron, of special interest in this day of demand for non-corrosive metals. A typical analysis shows 18% chromium, 8% nickel and up to 0.20% carbon and should not be confused with the alloys of quite different composition known popularly as "stainless steel."

Chrome-nickel iron is sold under many trade names such as Allegheny Metal, Carpenter Stainless Steel No. 4, Defistain Rustless Iron, Duraloy 18-8, Enduro KA2, Midvale V2A, Resistal KA2, Stainless N, Sterling Nirosta and Sweetaloy 17. It melts at 2500 to 2700°F., takes a beautiful mirror polish untarnished by atmospheric conditions and is extremely resistant to a large variety of chemicals, gases, and organic acids. This

latter property makes it useful in the canning industry or wherever fruits and vegetables or their products are to be handled.

Another valuable property is the ability to retain its tensile strength at high temperatures which makes it useful for high-pressure high-temperature work such as cracking gasoline. The metal is readily welded and can be worked with no unusual difficulty. Methods of heat treatment covered by Krupp patents are believed to make the metal more easily worked. Its uses are manifold, and most recent interesting uses are in the new Chrysler building in New York where the entire tower is to be covered with this metal. It will replace many articles which are now nickel plated and where a solid metal has advantages over plated articles.

By C.K.

Progress of Organic Chemistry, 1924-1928. II. E. LEHMANN. *Z. angew. Chem.*, **43**, 6-12 (Jan. 4, 1930); 47-8 (Jan. 11, 1930); 63-6 (Jan. 18, 1930); cf. *THIS JOURNAL*, **6**, 2050, 2282 (1929).—*Aliphatic Series:* 1. *Hydrocarbons.* a. Saturated. b. Unsaturated. c. General considerations. d. Simple unsaturated. e. Complex unsaturated. f. Rubber. 2. *Oxy-compounds.* a. Monoxy. b. Dioxo. c. Trioxy. d. Tetra- and polyoxy. e. Oxides. f. Ether. 3. *Oxo compounds.* a. Aldehydes. b. Ketones. c. Ketenes. d. Oximes. 4. *Oxyoxo compounds (sugar group).* Monosaccharides, Disaccharides.

L.S.

The Mutual Influence of Organic Compounds in the Animal Body. F. KNOOP. *Science*, **71**, 23-5 (Jan. 10, 1930).—One organic compound undergoing oxidation gives H₂ to a reducible substance such as an aldehyde or a ketone, and transfers with it some of its heat of combustion. This extra energy explains why the process may take place spontaneously and can well be accelerated by catalysts.

Most oxy- and ketonic acids are interconvertible. Probably every organic substance in the body has in relation to every other one a certain redoxpotential which will vary according to the condition of pH, of temperature, of O₂ concentration, of the catalysts present, etc.

G.H.W.

Significant Developments Regarding Soil Corrosion. H. W. HOUGH. *Sci. Mo.*, **30**, 132-40 (Feb., 1930).—An illustrated article dealing with some of the problems involved in the study and correction of corrosion of various metals buried in different locations. It has been found that the rate of corrosiveness is proportionate to the rate at which hydrogen is evolved and removed from the surface of the metal. This serves as a means of measuring corrosion. In addition to this, practical methods for appraising and charting the relative intensity of soil corrosion in various locations have been worked out. These involve both a chemical study of the soil and a topographical survey of the localities. The chemical analysis involves a determination of the relative proportion of soluble salts, the amount of moisture, the active acidity of pH, and the total acidity. From these and other accelerating or inhibiting factors, the soils are given a relative corrosion rating.

G.W.S.

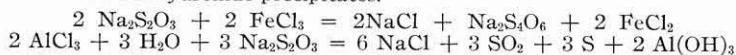
SCIENTIFIC REVIEWS AND BIBLIOGRAPHIES

Recent Progress in the Chemical Study of the Vitamins. J. C. DRUMMOND. *Chem. & Ind.*, **49**, 1T-10T (Jan. 3, 1930).—*Messel Memorial Contribution.* We are still in doubt as to whether vitamin A is a single chemical individual or a group of substances. This vitamin may be concentrated in the non-saponifiable fraction of solutions of it in oil. Attempts to identify it as carotene or dehydroergosterol have so far been unconvincing. Evidence seems to indicate that vitamin D is formed from ergosterol by a photochemical reaction. Vitamin E may be concentrated in the non-saponifiable fraction of wheat-germ oil but as yet nothing to indicate the chemical nature of the active substance has been published. Vitamin C may be concentrated from lemon juice; some of the conditions which determine the stability of this vitamin have been studied but very little is known as to its chemical nature. Vitamin B is probably a mixture of three vitamins. The B₁ variety appears to be a basic substance of relatively simple composition, and we may expect that in the near future its nature and constitution will be established. Very little is known about the other two vitamins B₂ and B₃.

"It is truly remarkable that so fundamental a process in the life of the animal as the formation of its bony skeleton should be dependent on the supply from external sources of an infinitesimal amount of a substance closely related to one which the tissues can synthesize." (Vitamin D and ergosterol.) E.R.W.

The Uses of Sodium Thiosulfate in Analytical Chemistry. E. DONATH. *Chem.-Ztg.*, **54**, 78-9 (Jan. 25, 1930).—The author gives a brief and critical review of the many important uses of sodium thiosulfate in analytical chemistry. They are: 1. Decomposition of ores containing arsenic and antimony. 2. The precipitation of sulfides by means of sodium thiosulfate, based upon work of Georg Vortmann. Sodium thiosulfate

can be used for the quantitative separation of copper from cadmium or zinc. 3. Separation of iron from aluminium. A neutral mixture of ferric chloride and aluminium chloride is boiled with excess sodium thiosulfate whereby the iron is reduced to ferrous chloride while aluminium hydroxide precipitates.



4. Chancel's method of separating iron oxide from alumina. 5. The titration against iodine. L. S.

That Peculiar Thing, Temperature. M. F. BÉHAR. *Instruments*, 3, 2, 129-35 (Feb., 1930).—A discussion of temperature and temperature scales; gives the International Temperature scale published in THIS JOURNAL, 6, 1352-4 (July-Aug., 1929).

H. H. K.

HISTORICAL AND BIOGRAPHICAL

Robert Andrews Millikan. (1) *Les Prix Nobel en 1923*. P. A. Norstedt & Soner, Stockholm, Sweden, 1924, pp. 20-3, 79-81.—Contains a brief outline of work for which the Nobel award was made, brief biographical notes, summary of researches, and portrait. (2) *Elec. World*, 78, 502 (1921).—Biographical notes. (3) *Ibid.*, 80, 1347 (1922).—Account of award of Edison Medal to Millikan. (4) *Science*, 59, 325-6 (1924).—Account of presentation of Nobel prize. (5) *Ind. Eng. Chem.*, 16, 131 (Feb., 1924).—Millikan awarded Hughes Medal by Royal Society of London in recognition of his work on the determination of physical constants. (6) *Ibid.*, 15, 1287 (Dec., 1923).—Short note on Nobel prize award. (7) *Forum*, 82, 193-201 (Oct., 1929). “What I Believe,” by R. A. ANDREWS. Millikan’s philosophy of life. M. W. G.

The William Hoskins I Know. L. V. REDMAN. *Chem. Bull.*, 17, 42-4 (Feb., 1930).—Hoskins has devoted himself to science in an untiring manner. His contacts are many and varied. “William Hoskins, who has long been acclaimed dean of western consulting chemists, has not confined himself to giving scientific counsel only. Through most of these 50 years he has been a fountain of hope to the discouraged, an inspiration to the ambitious, a companion of the strong, and always an unselfish, devoted, big brother to us all.” H. T. B.

Chemistry Then and Now. W. HOSKINS. *- Chem. Bull.*, 17, 40 (Feb., 1930).—“Then”... in 1880, there were three chemists in Chicago trying to make a living. Manufacturing processes were based on hit or miss, rule of thumb methods. Much of the chemical work was confined to testing and analyzing ores, checking imported materials, and settling disputes. Apparatus was largely imported, and expensive. Instructors in chemistry had little practical experience; college laboratories were below the standard of present-day high-school laboratories. “The center of the movement of chemical application to industry is now in research, the modern question mark.” H. T. B.

William H. Nichols. See page 1112 of THIS JOURNAL.

Jöns Jakob Berzelius. R. WINDERLICH. *Z. physik. chem. Unterricht*, 42, 193-203 (Sept.-Oct., 1929).—Jöns Jakob Berzelius was born at Väversunda in Ostgotland on August 20, 1779. His parents died when he was a few years old. At the age of 14 he entered the Gymnasium at Linköping; he worked his way through school by tutoring. His love of natural science was not greatly appreciated by his teachers and his diploma stated that he was a good-natured young man with bad manners and doubtful chances for the future. When a student at the University of Uppsala he surprised the faculty and his fellow students by his discovery of a method of preparing oxygen. During the vacations he worked in a pharmacy at Vadstena where he learned the art of blowing glass. Later, as a physician in Stockholm, he became acquainted with W. v. Hisinger who was the owner of a mine. They began some research work in order to discover the laws which govern the chemical action of galvanic columns. The results of their work appeared in 1803 and formed the basis of the electrochemical theory which was developed later. Five years afterward he became lecturer in chemistry at Stockholm. In 1807 he was elected professor, and in 1809 a member of the Academy. His “Tierchemie” appeared in 1806 and the first volume of his famous “Textbook of Chemistry” was published in 1808.

Berzelius had to prepare all his chemicals as they could not be bought in Sweden. He invented the alcohol lamp and the wash bottle; he substituted rubber tubing for leather tubing; he showed that it was more accurate to work with sensitive balances and small quantities of materials and he taught a large number of simple devices which facilitate chemical work. From the analysis of many compounds he came to believe that there existed definite and simple proportions between the quantities of elements that are present in any compound. At first he doubted the correctness of Dalton’s Theory

but he soon became its most ardent defender. However, he soon found that Dalton's figures were not very accurate. This was the cause for his tremendous amount of work on the atomic weights of elements. His first table of atomic weights appeared in 1814; an enlarged and corrected table of 1818 listed 46 elements and 2000 compounds which he had analyzed himself. Berzelius referred all his atomic weights to oxygen which he regarded as the "Pole of Chemistry." He advised his students that a given sample should always be analyzed in various ways and that one should always obtain at least three checks and should never be satisfied with just one analysis.

His article "Über die chemische Zeichensprache und die Art ihrer Anwendung zum Ausdrucke der chemischen Proportionen" [Schweigger's, *J. Chem. Phar.*, **13**, 240-3 (1815)] marks him as the creator of chemical symbols and their applications. He showed how to calculate per cent composition from the formulas derived. Berzelius developed quite an interesting mechanism for chemical reactions on the assumptions that every chemical process was also an electrical process. He systematized chemical knowledge and classified all substances into electronegative (acids), electropositive (bases), and indifferent.

In the winter 1812-13 he was given a large collection of minerals. In order to be able to arrange the ores systematically he began an intensive study of mineralogy. He soon found that the classifications then used were not very efficient and began to work out a scientific system of mineralogy by the application of the electrochemical theory and chemical proportions. He stated in various articles published at that time that mineralogy should be a subdivision of chemistry. He proved that any given mineral had always the same composition no matter where it came from. After various attempts he finally worked out a classification in which the minerals are arranged according to their electronegative compounds.

During the analysis of the slimy mud at the bottom of a sulfuric acid plant he discovered the element selenium. He emphasized the fact that sulfur, selenium, and tellurium formed a triad just as chlorine, bromine, and iodine. Later he announced the discovery of thorium and the preparation of elementary silicon, titanium, tantalum, and zirconium. He did a large amount of work on molybdenum, vanadium, the noble metals, thiosalts, Cassius' Goldpurple, tartaric acid, and others. He coined the terms isomerism, polymerism, allotropy, and catalysis when illustrating and explaining the results of his works.

From 1821 until his death on August 7, 1848, he published his "Jahresberichte" in which the great master gave very complete yearly reports on chemistry and related fields.

L. S.

The Liebig Museum in Giessen. F. HILDEBRANDT. *Chem.-Ztg.*, **53**, 889 (Nov. 16, 1929).—In the winter of 1910-11 a number of men of science and industry met to found the "Gesellschaft Liebig Museum." They planned: (1) to purchase the Liebig laboratory and to renovate it; (2) to erect a Liebig museum in the same building; (3) to further the cause of chemistry. The building was bought. Many of the various pieces of apparatus which Liebig had used and which had been taken to other places were brought back. The rooms were put in their former condition. Books and many other objects were obtained that dealt with Liebig and his laboratory. The author suggests the following program for the Society: 1. to arrange the apparatus and utensils in various groups such as to show the primitive character of a chemical laboratory of 100 years ago and to publish a guide for the laboratory together with a biography of Liebig; 2. to build up the library which should consist mainly of the original articles of Liebig; 3. to publish the letters of Liebig and his friends.

The author closes his article with an appeal to the men of science and industry to aid financially and to enlist new members.

L. S.

Calorimetry in America. S. W. PARR. *Instruments*, **3**, 71-6 (Feb., 1930).—A historical discussion of the development of calorimetry in America.

H. H. K.

The Centigrade Thermometer. G. F. HENNION. *Catalyzer*, **7**, 1-3 (Oct., 1929).—It is well known to every student of chemistry and physics that the centigrade (or Celsius) laboratory thermometer was named after the Swedish astronomer, Anders Celsius, who first proposed such a measurement of heat in a paper in 1742 before the Swedish Academy of Sciences "on the measurement of heat."

Five years before this paper, in 1737, Carolus Linnaeus, a botanist (who was later to occupy the chair of botany at Celsius University) published a one-volume book, "Hortus Cliffortianus," describing the botanical specimens in the gardens of George Cliffort, a banker. In this volume, by peculiar circumstance, there is reference to what is undoubtedly the centigrade thermometer. It appears in Linnaeus' book in the following way.

The frontispiece of the original is an artistic study. In the center foreground are

shown, among other objects, six people in various poses, several potted plants, a tree and a dragon. In the near foreground there appears a small child seated on a step, and a second child standing, who leans on a garden spade. The seated child holds in his right hand a mounted thermometer at which he is pointing with the forefinger of his left hand. The startling fact is that the thermometer is a centigrade one without a doubt. The graduations are clear. There are exactly 100 above zero, and 100 below. The number 1 is in the center of the scale, while graduations are marked by tens in Arabic numerals. This is then essentially the centigrade thermometer disclosed five years before the paper by Celsius. No reference to indicate the location of freezing or boiling points can be found in Linnaeus' writings. The article contains a full-page reproduction of a part of the original frontispiece.

By CK

History of the Bunsen Burner. *Z. Komprimierte Flüssige Gase*, **28**, 48 (1929).—In reply to a communication from Feldhaus (*Chem. Apparatur*, **14**, 252) according to which the gas engineer R. W. Elsner independently and contemporaneously with Bunsen invented the non-luminous gas burner, Prof. Biltz shows (*Z. angew. Chem.*, **41**, 112; see THIS JOURNAL, **6**, 391 (Feb., 1929) for abstract of this article) that the principle had even been used by Faraday. In the 1828 edition at Weimar of Faraday's book "Chemical Manipulation or the Necessary Technic of Successful Chemical Experiments" a detailed description is given on pp. 128-30 of such gas burners. This burner had a brass or copper cone fastened on to the burner tube. This cone was similar to the present-day Bunsen chimneys, but the upper opening was much smaller, and indeed only slightly larger than the opening of the burner tube. By pushing the cone down, a luminous flame was obtained. Similar arrangements were also described for Argand burners and other ring-shaped burners. A model of Faraday's burner has been put on exhibition in the Deutsches Museum. Even though the principle of the burner was not original with Bunsen, the modern form of it is nevertheless due to the monograph used in the Heidelberg laboratory entitled "Wire Gauze Burners and Other Arrangements for Maintaining Steady Flames with Varying Light Intensity." The original Bunsen burner had four openings below in a square piece of metal, through which the primary air was admitted. These had to be stoppered individually when a luminous flame was desired. The movable collar was a later addition.

H. C. DUUS

EDUCATIONAL MEASUREMENTS AND DATA

The Student's Working Load. F. W. REEVES AND J. D. RUSSELL. *J. Higher Educ.*, **1**, 85-90 (Feb., 1930).—By means of interviews and questionnaires the authors determined the working load of college students and found it to be much less than the accepted theoretical standard of three hours of work for each hour of credit. H. H. K.

Student Honesty in a University with an Honor System. W. G. CAMPBELL AND H. L. KOCH. *Sch. & Soc.*, **31**, 232-40 (Feb. 15, 1930).—An extensive study of student honesty at a large state university where an honor system had prevailed for many years, revealed that all degrees of dishonesty existed. The thoroughness of supervision and the seating of an individual during examinations were, of course, influential factors as to the extent of cheating. Lectures on honesty apparently had little or no effect and indications were that there was much less cheating among students who had been supervised during their secondary training than among those trained under an honor system.

K. S. H.

The Reliability and Validity of Oral Examinations. E. J. BARNES AND S. L. PRESSEY. *Sch. & Soc.*, **30**, 719-22 (Nov. 23, 1929).—Results obtained in examining graduate students by committees composed of other such students, in an attempt to ascertain the reliability and validity of oral examinations, are given. Because of the information obtained, the writers stress the importance of a scientific experimental attack upon problems of higher education.

K. S. H.

THE PHILOSOPHY OF EDUCATION

Need of a New Type University. D. E. PHILLIPS. *Sch. & Soc.*, **30**, 627-32 (Nov. 9, 1929).—In setting forth some of the glaring faults of our present system of college education, the author shows how students come to college for countless other reasons than the pursuit of knowledge and how faculties are chosen and promoted for all manner of reasons other than an ability to teach.

An entirely new type of educational institution is proposed, where students may come at sixteen without entrance requirements, and where only those who come for the real joy of study will be interested in staying. Such an institution will be without secret

societies, athletics, extra-curricular activities, and will grant no degrees. Persons entering will gain a broad cultural background and will stay as long as they wish. They will leave when they are satisfied that they have exhausted the resources of the institution in the subjects in which they are interested.

K. S. H.

Academic Freedom in a Christian College. E. D. SOPER. *Sch. & Soc.*, 30, 521-33 (Oct. 19, 1929).—Dr. Soper discusses the problem of free-speech in a university and maintains that no student, because of the influence of some faculty member, should be robbed of the religious experience he possesses or turned away from what might otherwise be a Christian life. It is the right and duty of every Christian college to control its teaching to some extent—to strike, if possible, a happy medium whereby justice may be done to both academic freedom and the maintenance of Christian character. If an instructor is definitely constructive, he will be able to present to students the present-day interpretations of religious and other problems so that they will be acceptable; laying for them even a better foundation than they previously possessed. They will not be left hopelessly suspended in mid-air.

K. S. H.

Building Character in Our Secondary Schools. G. W. ROSENLOF. *Neb. Educ. J.*, 10, 69-70 (Feb., 1930).—Some constructive suggestions looking toward character building find expression in: formulation of a school code by the pupils themselves; responsibility shared by the pupils in the administration of such a code through some form of student self government; a wise use of convocation periods to establish *esprit d'corps* of the student body as a whole; encouragement of pupil activity in school clubs. Motto, "Every student active in some school organization;" a fuller recognition and use of the school library as a very important tool for character building; a conscious effort put forth in making both pupils and teachers appreciative of the school plant—grounds, buildings, equipment, and adornment.

A program of physical education and athletics affords a most salient opportunity for either building or tearing down character. "Every subject in the curriculum affords ample opportunity for inculcating ideals, attitudes, perspectives. Moral qualities of every sort are inherently a part of every subject."

B. C. H.

Self-Education in Harvard College. See this title on page 1194.

The Spirit of the University of Chicago. Presidential Address. R. M. HUTCHINS. *J. Higher Educ.*, 1, 5-12 (Jan., 1930).—A characterization of the university's past and an outline of its future. Presents the idea that constant research and experimentation are the functions of a university.

H. H. K.

PROFESSIONAL

Teachers Wanted. J. G. BOWMAN. *J. Higher Educ.*, 1, 13-6 (Jan., 1930).—The author describes the good teacher as one who can vitalize facts; one who teaches students to be more than mere technicians; one who implants in them some one steady ideal.

H. H. K.

The Plain Facts about the Status of College Teaching. H. T. MCKINNEY. *Sch. & Soc.*, 31, 119-21 (Jan. 25, 1930).—Dr. McKinney attacks the statement recently made that "the best teaching in America is in the primary grades, the next probably in the high schools and the poorest of all in the colleges." No generalization can be made that college teaching is poorer in all respects than that of primary and secondary schools. The high-school teachers have their complaints concerning the material passed on to them from the lower grades, and the colleges wonder how many of the pupils ever "got by" their elementary and high-school courses. It being the duty of the college to turn out in four years, a finished scholar, the necessity of thorough early training is obvious. Good, bad, and indifferent teachers are to be found everywhere and are not typical of any one phase of education.

K. S. H.

Some Examples of Student Criticism of Teaching. G. S. WYKOFF. *Sch. & Soc.*, 30, 512-3 (Oct. 12, 1929).—This article cites some of the constructive and destructive criticisms of teaching as made by students at Purdue University. These criticisms are obviously very deeply colored by the temperament and interest of the individual.

K. S. H.

The Teacher Again. G. NORLIN. *Sch. & Soc.*, 30, 351-8 (Sept. 14, 1929).—The ideas held by university professors regarding the nature and worth of teaching in secondary schools, and vice versa, is set forth by Dr. Norlin who is inclined to agree with school superintendents that failures in college are due to the fact that the individuals have passed from the hands of competent teachers into those of untrained instructors.

Existing impressions of present-day education, and of those engaged to impart knowledge, are cited, and recommendations to graduate schools—as resolved upon at the Chattanooga Convention—are given.

K. S. H.

CONTEMPORARY NEWS AND COMMENTS IN CHEMISTRY AND EDUCATION

The Spirit of the University of Chicago. *Presidential Address.* R. M. HUTCHINS. See this title on page 1201.

The American Association for the Advancement of Science; Reports of the Des Moines Meeting. *Science*, 71, 137-68 (Feb. 7, 1930). G. H. W.

Priestley Medal Award. *Ind. Eng. Chem.*, 21, 896-8 (Oct., 1929).—A report of the meeting on September 11, 1929, at Minneapolis for the purpose of presenting to Mr. Francis P. Garvan the Priestley Medal. This report contains a brief history of the founding of the Priestley Medal for distinguished services to chemistry and a brief summary of Mr. Garvan's contributions to chemistry by Irving Langmuir, president of the American Chemical Society; a short address of acceptance by Mr. W. W. Buffum for Mr. Garvan who was not present because of poor health; a short address by Julius Stieglitz, who then read Mr. Garvan's address "Random Thoughts of a Lay Chemist." The three "random" thoughts which Mr. Garvan considers concern the relation of the development of American chemistry to the furtherance of the peace of the world; chemistry as an agent of peace; and considerations of the causes for a lack of proper appreciation and assistance for the development of American chemistry.

Mr. Garvan is the third recipient of the Priestley Medal—the others were Ira Remsen (1923) and Edgar F. Smith (1926). BYCK

The Perkin Medal Award Address. See "Economic Trend in the Chemical Industry," by H. H. Dow, page 1202 of this issue.

GENERAL

Industrial Progress Made through Research and Its Economic Importance. W. R. WHITNEY. *Metals & Alloys*, 1, 370-2 (Feb., 1930).—The growth of the creative spirit has reached a point where men enjoy working because of the artistic and creative urge. The history of research has been about the same in all countries as its earliest impulses came from the monks. Perhaps in no one case is the effect of long-continued academic research more in evidence than in the chemical industry, upon which enormous and varied industries were established. Industrial research is something designed to discover unused materials and processes, to bring about better use of old materials, to reveal new wants, create new desires, and actually predetermine new needs. R. L. H.

Economic Trend in the Chemical Industry. H. H. Dow. *Chem. & Ind.*, 49, 38T-40T (Jan. 17, 1930).—Abridged paper from the address delivered on the occasion of the presentation of the Perkin Medal to the author. The four most conspicuous labor-saving devices in chemical plants are: (1) larger equipment; (2) automatic analysis; (3) automatic operation; (4) continuous operation. As concrete examples the development of bromine recovery and the manufacture of magnesium sulfate, are outlined briefly. E. R. W.

German Gas Contains Helium—but Not Enough to Be Useful. There are natural gas wells in Germany whose output contains helium, writes Kurt Weil in *Die Umschau*, a well-known German scientific periodical. But there is no prospect of the Graf Zeppelin or any of her future sister airships being filled with German helium, for the combined product of all of the four German wells whose gas contains this valuable element would have to be accumulated for 400 years before there would be enough to fill the Graf.

By means of extremely delicate tests devised by Profs. Paneth and Peters, noted German analytical chemists, the percentage of helium was determined for a number of gas wells in Germany. The richest of these was a small well at Ahlen, Westphalia, whose product assayed nineteen hundredths of one per cent helium. But this well flows only 41 cubic meters of gas a day, and would therefore yield the relatively insignificant volume of eight-tenths of a cubic meter of helium in that period. As compared with this, Herr Weil cites the great American well at Petrolia, Texas, which yields 425,000 cubic meters of gas, with a helium content of nine-tenths of one per cent. This would fill a Graf Zeppelin in a few days. The German writer adds the comment that Nature has treated Germany, the home of the Zeppelin, "like a stepmother."—*Science Service*