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Contents.

(Illustrated articles are marked with an asterisk.)

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No. 803.

For the Week Ending May 23, 1891.

Price 10 cents. For sale by all newsdealers.

Table listing sections such as 'I. ASTRONOMY.—The Great Equatorial of the Paris Observatory.', 'II. CHEMISTRY.—An Apparatus for Heating Substances in Glass Tubes under Pressure.', 'III. CIVIL ENGINEERING.—The Compressed Air System of Paris.', etc.

ORIGINAL WORK IN AMERICA.

COLUMBIA COLLEGE, NEW YORK CITY.

Resuming the narrative of our inquiries: Seth Low, LL.D., President of Columbia College, said: "We at present are in an unsettled condition. Radical changes are taking place and entire reorganization is in progress; and so, with regard to what the professors in the college are doing in the way of original work, I am not just now able to speak. It is my opinion, however, that this is indeed an important function of the ideal university. The college, is concerned with pedagogics, with the work of teaching what is already known. The university is concerned with higher things than that. Its duty is to add to the sum of human knowledge. The college, of course, is the seed whence springs the university, but it is for the sake of the tree that the college exists. I do not mean by this to deprecate the work of undergraduate instruction. This is as essential, as honorable, a vocation as it has ever been. But for those members of Columbia's faculty who have given promise of good work in this field, it is our aim to secure the time and means whereby they can do original work in their respective branches. One of the great distinctions between a college and a university is the fact that the college concerns itself with teaching what is already known, while the university seeks to widen the domain of what is known and taught. In order to carry on this work in scientific investigation, a new system of fellowships has been established. After July 1, 1891, there will be twelve fellowships, after July, 1892, eighteen, and after July, 1893, twenty-four fellowships, each of the value of five hundred dollars a year. They are to be awarded by the president, with the advice of the University Council, to those applicants who give evidence of fitness to pursue courses of higher study and investigation, and the competition for these prizes is to be open to graduates of any college or scientific school. The fellows so appointed are to hold office for one year. No fellow, moreover, shall be permitted to accept remunerative employment except by permission of the president."

Elwyn Waller, A.M., E.M., Ph.D., Professor of Analytical Chemistry in the Columbia College School of Mines, said: "The work of original investigation in science at Columbia is not as extensive as we would wish for, owing to the fact that the time which ought to be devoted by the professors to research is taken up by the routine duties of instruction. This is true of all the departments in this school. There is a desire on the part of the officers to engage in this work, but we are all handicapped by lack of time. In spite of this, however, fairly good work is being done in several of the branches of natural science. In this department I have been engaged for some time with the study of lithia mineral waters, and the method of determining the presence of lithia in liquids bearing that name. As a result of my investigations, I have found that many of the liquids known and advertised as lithia waters really contain a very small quantity of this ingredient. A study has also been conducted in this laboratory of the determination of manganese and zinc as pyrophosphates. The plan for the determination of these metals after precipitation as carbonates, although very tedious and troublesome, has always been the favorite one with chemists. But a method involving less trouble has been called for, and to meet this demand, the precipitate of manganese as pyrophosphates has met with much favor. A question of great uncertainty has been the solubility of the precipitate in ammonium salts and the volatility of the precipitate in ignition. In order to reach some conclusion in this matter, three small quantities of pure zinc were weighed out and dissolved respectively in sulphuric, hydrochloric and nitric acid. The solutions were then diluted to known bulk, thoroughly mixed and aliquot portions taken for experiment. Precipitates of the solutions were then filtered and washed by decantation. Finally, when no reaction was given by the washings for phosphates, the precipitate by the aid of some nitric acid was dissolved and the solution filtered and poured into a weighed platinum dish; the zinc being rinsed into the dish with distilled water. The dish and its contents were then weighed, after evaporation and careful ignition. The object of this was to reduce the action of burning filter paper upon the precipitate, thus avoiding the consequent loss of zinc. The conclusion is that the disregard of this precaution and the consequent loss of zinc was the cause of the former opinion that the precipitate was partially volatilized on ignition. We have also been engaged in experiments on asphalt, for paving and other purposes. An apparatus has been devised to test the hardness of this substance; and many interesting experiments are being made in this comparatively new field."

Nathaniel L. Britton, E.M., Ph.D., Professor of Botany in the Columbia School of Mines, said: "I am engaged at present with the investigation of the flora of Bolivia, based on the extensive collections made in that country by Dr. H. H. Rusby, in 1885-1886, and the collections now being made there by Mr. Miguel Bang. I am also making a study of miscellaneous northern plants including the genera Lechea, Lespedeza, and Rynchospora. Mrs. N. L. Britton, voluntary assistant in

the Botanical Laboratory, is now investigating the mosses of North America, based on the collections recently made by Mr. J. B. Leiber, in Idaho. Dr. Morong, Curator of the Laboratory, is at work on the flora of Paraguay, based on collections made in that country by himself during the past three years. He is also making a study of the various North American plants with especial reference to aquatics, and a study of the order Haloragaeae, a work now nearing completion. Among other studies, an important one is that now being carried on at the laboratory by Miss A. M. Vail, an interesting work on the North American species of the genus Desmodium. Besides this, study is being made of the North American species of the genus Polygala and the genus Xyris."

Ogden N. Rood, A.M., Professor of Physics in Columbia, said: "I have almost completed an optical investigation with the object of determining quantitatively the relative intensities of colored lights which are not complementary, also a study of the contrast of color, quantitatively. Besides this, my assistants are engaged on a number of subjects. Among these are: a study of the conducting powers of liquids for electricity, by means of the Kohlrausch method; an investigation of the methods of measuring the velocity of sound, and a study of the electrical resistance of contacts. No member of this department is engaged in any commercial or outside work whatever. There is one feature of work in which some college professors are accustomed to indulge, and which cannot be too strongly condemned. That is when a man under salary from a great university, trading on the name and fame of the institution, holds himself in readiness to testify as expert witness for a pecuniary consideration. This practice, I take it, is one which ought to be discouraged by the authorities of the colleges where it exists. The time of a college professor should be devoted to teaching and to original research, to the interests of the students, and the advancement of science. The office should not be prostituted in such a manner by self-seekers and mercenary men. There is, so far as I know, only one institution where this practice is not known, that is at Johns Hopkins. The only reason that makes such expert testimony valuable in the eyes of the jury is the fact that the witness is an officer in a prominent institution of learning; and this looks, to me, like trading in the reputation of the college, and a great breach of, to say the least, good taste."

PROGRESS OF STEAM ENGINEERING.

We have received from the Babcock & Wilcox Company a list of some of the high pressure boilers put out by them, which well illustrates the advances made within the last few years in the economies of steam engineering. The list gives the location of some seventy-five boilers, all of which are in constant use, carrying pressures of 200 pounds per square inch to 250 pounds and over. In one instance 300 pounds is regularly carried. These are mostly used for compound triple expansion and quadruple expansion engines. It shows that it is not only practicable but economical to carry such high pressures, if the engine plant is properly designed.

Theatrical Face Paints.

Torjesen gives the following formulæ:

White.—Oxide of zinc, subnitrate of bismuth, and plumbate of alumina—of each, 1 oz. Mix, and make into a paste with almond oil (5 to 6 drachms required), and perfume with 12 minims of peppermint oil, 12 grains of camphor, and a drachm of ess. bouquet.

Bright Red.—Oxide of zinc, subnitrate of bismuth, and plumbate of alumina—of each, 10 drachms; eosin, 2 1/2 grains, dissolved in a drachm of ess. bouquet; oil of peppermint, 12 minims; camphor, 12 grains; almond oil, a sufficiency to make a paste. Mix as above.

Deep Bordeaux Red.—Oxide of zinc, subnitrate of bismuth, plumbate of alumina—of each, 15 drachms; oil of peppermint, 12 minims; camphor, 12 grains; carmine, 30 grains (dissolved in 80 minims of solution of ammonia); almond oil, a sufficiency; ess. bouquet, 1 1/2 drachms. Mix.

Skin Color.—Vermilion, 3 drachms; tincture of saffron, 2 drachms; powdered orris, 5 drachms; precipitated chalk and oxide of zinc, of each, 20 drachms; camphor, 20 grains; oil of peppermint, 20 minims; ess. bouquet, 1 1/2 drachms; almond oil, a sufficiency. Mix.

Black.—Drop black (made by burning camphor and washing the soot with spirit), 2 drachms; almond oil, 2 drachms; coconut oil, 6 drachms. Mix, perfume, and cast into sticks.

It Pays to Advertise in the Scientific American.

In a recent letter to the publishers of this paper the Felt & Tarrant Manufacturing Company, of Chicago, writes:

"We hardly think it advisable to change our advertisement in the SCIENTIFIC AMERICAN, as the present wording brings us a constant stream of inquiries and numerous sales. It has brought us orders direct from South America, Brazil, Mexico, Peru, India, and all principal countries of Europe, and is by great odds the best advertising medium we have yet found."

**The Influence of Different Foods and Medicines Upon the Human Gastric Juice.\***

BY DR. WOLFF.

The author in making a series of experiments upon the influence of various articles of diet and medicine upon the gastric juice first ascertained the ordinary amount of acid present in the stomach of the person experimented upon and the time of its disappearance after Ewald's test meal, consisting of a roll weighing about an ounce and a quarter and ten ounces of water, and used the results as a standard for comparison.

When certain quantities of alcohol were added in the shape of 50 per cent cognac or Munich beer, the conclusion arrived at was that small quantities of alcohol, about 20 per cent, have a slight power of raising the HCl secreted, but in larger doses, 30 per cent or over, they hinder the secretion and peptonization. Besides, the experiments seem to show that, when regularly used, the stomach, after a time, fails to respond to its usual stimulus, the food; the required amount of stimulant becomes greater, the use of alcohol more frequent, the glandular function of the stomach becomes more and more affected, and the way is opened to the whole train of dyspeptic symptoms, ending at last in atrophy.

Concerning the influence of coffee in infusion, he can give no information, because the color of the beverage interferes with the reaction of color tests. He substituted, therefore, caffeine, which he administered in the form of powders along with rad. althææ. The result is that in doses of 20 cg., and still more in larger quantities, it has the property of lessening the total acidity at the height of indigestion; it also lessens the secretions of HCl, and delays peptonization. Since that amount of caffeine exists in the quantity of coffee taken usually by men, and more especially by women, we may assume that it has a similar action upon them.

Nicotine was next experimented with, a certain quantity—one mg.—being introduced by the sound after a test meal. Only three patients were tested, and of these, in two cases, there was a very slight rise in the acidity; in the third, a slight rise also at first, but after several days' use a material lessening of the secretion and delay in peptonization. The experiments are admitted to be too few to draw safe conclusions from.

Turning to the action of bitters on the secretion, Dr. Wolff refers to the experiments of Tschelzoff on animals, and Jaworski on men, which show that these drugs lessen the secretion of acid to such a degree that Jaworski attributes the commonly supposed beneficial employment of them in dyspepsia to their influence in lessening the acidity where hypersecretion exists. Wolff tested first the action of nitrate of strychnia in doses of 0.5-1.5 cg. The effect was found to be that where the acidity was below the normal, strychnia considerably raised it, but where HCl was habitually absent, the drug failed to call it forth. Infusion of eundurango seemed to have no, or very little, influence on the acidity, but a slight increase of the secretion of pepsin may be produced. Reichmann's experiments, a review of which was published in the *Chronicle*, gave nearly the same result. Bitter infusions poured into the fasting stomach produced less secretion than plain water, but when administered along with food, the bitter quickly disappears, and the secretion is afterward considerably increased; where, however, alkaline or neutral juice is ordinarily present, bitters are unable to provoke the secretion of HCl.

Three persons were experimented on with 15 to 20 c. cm. of ox gall, administered along with a test meal. It was found that the acidity was thereby lessened, but there was no considerable diminution of the HCl or hindrance to peptonization.

Administering 5 g. of common salt with the test meal to patients either with lessened or increased secretion of HCl invariably lessens the amount of HCl present, in cases of hyperacidity to one-half, with a corresponding improvement in the symptoms. The beneficial action of such waters as Wiesbaden and Kissingen must therefore be chiefly attributed to the lessening of the secretion of HCl, but their influence on absorption and the motor function of the stomach may be beneficial, and that on metabolism generally must not be neglected.

The author cites, before making experiments of his own on the action of Carlsbad salts, the results of the latest experiments of Jaworski, that "small quantities of Carlsbad water or salt stimulate the secretion of acid and the digestive activity, but when used in large quantity they stop the secretion and digestive power for several hours; that under this medication from day to day the activity of secretion and digestion constantly diminish, and at last the sensibility of the stomach to irritants is lessened to such an extent that no kind of food suffices to produce acid and frequently not even pepsin secretion." Ewald found, however, that in ten persons subjected to a course of thermal water, and tested at frequent intervals during the time, half had slightly lessened acidity, the other half increased, and the lessening occurred in those who before the treatment had a high acidity. Jaworski has also found

borax to act primarily as an irritant in small doses, but in large doses it causes a lessening or total drying up of the secretion.

Wolff, on the ground of the experience obtained of the action of common salt, Carlsbad salt, and borax, has administered a powder of the following composition in cases of hyperacidity, with or without hypersecretion, with great success: Sulphate of soda, 30 g.; sulphate of potass., 5 g.; chloride of soda, 30 g.; carbonate of soda, 25 g.; sodæ bibor., 10 g.; half a teaspoonful three times a day, in half a glass of lukewarm water, fasting, and two hours before dinner and supper. In a typical case of hypersecretion the quantity of fluid in the fasting stomach was reduced, by four weeks' treatment, from 50 c. cm. to a few cubic centimeters, and the acidity, at the height of digestion, by one-third.

Referring to the influence of acids on the secretion, Wolff found that when hydrochloric acid was administered to three patients in whom it was habitually absent, for periods of eight days, there was not in a single case any distinct action on the HCl secretion. A distinction ought to be made, perhaps, according to the results of Jaworski's experiments, between ordinary acids and carbonic acid, since the latter exercises a purely mechanical influence, and in some raises the acidity considerably, and increases the peptic power of the gastric juice.

**Dangers of Pharmacy.**

Mr. George Weddell contributed lately a paper on this subject to the Newcastle-on-Tyne Chemists' Assistants' Association. The full title of Mr. Weddell's paper was, "Some Dangers of Pharmacy in Storing, Handling, Manufacturing, Dispensing, and Selling Dangerous Drugs and Chemicals." In this paper he said he was only opening a rather extensive subject. He had been favored with assistance from Mr. Atkins, of Salisbury; Dr. W. Inglis Clark and Mr. Dott (Duncan, Flockhart & Co.), Messrs. Smiles and D. Mackenzie (T. & H. Smith & Co.), and Mr. Peter Boa, of Edinburgh; Mr. Lane (Woolley, Sons & Co.), Manchester; Mr. Martindale, Mr. C. Umney, and the editor of the *Chemist and Druggist*, London; also from his local confreres, Messrs. Bambridge, Clague, Park, and B. S. Proctor; and from Mr. Linford (Lothouse & Saltner), Hull. Mr. Weddell said it was impossible in a single evening to go thoroughly into all the dangers of pharmacy, but promised that if members of the calling would assist him by sending him their experiences of danger, whether physical, chemical, physiological (poisons), or legal, he would, when leisure permitted, bring the matter in a more or less compact form before the general body of chemists and druggists. He also asked them to consider nothing too commonplace, or, on the other hand, too uncommon, to be communicated, and promised due acknowledgment to contributors. The points on which he invites information are dangers incurred in:

Storing, Handling, Manufacturing, Dispensing, and Retailing	Inflammables. (Also notes on Spontaneous Combustion.) Explosives. Corrosives. Poisons { Vapors, Liquids, and Solids.
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The following are among dangerous substances and compounds mentioned by Mr. Weddell:

<b>INFLAMMABLES.</b>	
Mixtures of H and O. Cotton wool (near gas). Sugars (in sirup making). Spirits (in heating or measuring near light).	Ethers. Ac. carbolic (in liquefying). Fats and oils. Carbons? Hydrocarbons.
<b>EXPLOSIVES.</b>	
Siphons of aerated water. Potass. chlor. (powdered in iron mortar, or trampled under foot on floor). Mercuric oxalate (in powdering). Argentic oxalate (in powdering). Fulminates of silver and mercury.	Argent. oxid. Phosphorus, amorphous. Picric acid and picrates. Nitroglycerine. Sulphur hypo-chlorite (in tapping stopper). Hypophosphites (in powdering).
<b>MIXTURES.</b>	
Pot. chlor. c. antim. nig. " c. hypophosphites. " c. glycerine. " c. ammon sulphuret. " c. morph. mur. " c. sulphur. " tannin. Pot. permang. c. glycerine. " c. alcohol. " c. fe. redact.	Pot. bichrom. c. alcohol. Pii, phosphori. Sp. terebinth. c. H <sub>2</sub> SO <sub>4</sub> . Iodine and iron. " and liq. ammon. fort. Nitrate of lead and charcoal. Ac. chromic. and glycerine. Strong acids and glycerine. Tr. nucis vom. c. acid. nitromar. dil. (burst).
<b>CORROSIVES.</b>	
Sulphuric acid (spurts if water added to it instead of it to water. What application?) Nitric acid. (What application?) Nitric acid fumes. (What application?) Hydrochloric acid.	Chromic acid. Chlorine. Bromine. Hydrofluoric acid. (Application?) Sodium. (Application?) Phosphorus. (Application?) Caustic soda. (Application?)
<b>POISONS</b>	

of various kinds were mentioned by the author, with precautions to be observed; and also a number of dangers of various kinds to be guarded against at the retail and dispensing counters, such as transposition of

labels on liniment and mixture bottles; labeling strong drugs "Poison," or "With caution," even (when for internal use) in giving customers what they ask for; protest or caution, if necessary; badly dried bottles for kali; when temperature rises, see to stoppered bottles, in case they burst; volatile liquids not to be kept on a high shelf; carbon bisulph., etc.; powdering chrysarobin, corrosive substances, plumbi acet., potass. cyanide, etc.; a mixture of calomel and gum forms a cement; in pills, danger of not having active ingredients (strychnine, ext. physostigmatis, etc.) thoroughly mixed; putting nitric or other strong acid in dirty bottle (turpentine, etc.); using distinctive bottles for external applications.

In closing, Mr. Weddell briefly touched on the legal dangers which beset the unwary pharmacist, such as drugs not up to requirements (Sale of Food and Drugs act); drugs under common names (citrate of magnesia, milk of sulphur, sweet spirit of niter, etc.); sale of S.V.M. on Sundays; sale of same for drinking or without license; use of same in preparations capable of being used internally; use in patent medicines (although unknown to seller); use of still without license, or for methylated spirit preparations; sale of medicated wines without license (if capable of being used as a beverage); acting as an apothecary (do not take pay); ships' medicine chests (not to requirements); stamp duty; poisons not labeled, or insufficiently so; sale of medicines capable of being used for improper purposes; buying goods dishonestly acquired, etc.

**Chicago Exhibition, 1893.**

The Exhibition is to be opened on the 1st of May, 1893, and closed on the 30th of October. All governments have been invited to appoint commissions for organizing the foreign sections. The duties of these commissions will be the same as in previous international exhibitions, applications for space having to be addressed to the commission of the country where the article is produced. The general reception of articles at the Exhibition is to commence on the 1st of November, 1892, and no articles are to be admitted after the 10th of April, 1893; but special installations will be permitted to be commenced as soon as the condition of the buildings allow. Products intended for competition must be so described; if not, they will be excluded from examination by the juries. The official catalogue is to be in English, French, German, and Spanish. The following are the twelve divisions of the classification:

- A.—Agriculture, forest products, forestry, machinery and appliances.
- B.—Viticulture, horticulture, floriculture.
- C.—Live stock—Domestic and wild animals.
- D.—Fish, fisheries, fish products, and apparatus for fishing.
- E.—Mines, mining, and metallurgy.
- F.—Machinery.
- G.—Transportation—Railways, vessels, vehicles.
- H.—Manufactures.
- J.—Electricity.
- K.—Fine arts—Pictorial, plastic, and decorative.
- L.—Liberal arts—Education, engineering, public works, architecture, music, and the drama.
- M.—Ethnology, archæology, progress of labor and invention, isolated and collective exhibits.

A limited amount of steam and water power will be supplied gratuitously. Power in excess of that allowed gratuitously will be furnished at a fixed price.

**Value and Importance of Trade Marks.**

In these days of bitter trade competition and price cutting, the value of patents and trade marks is much more appreciated and sought after than heretofore. In many cases a trade mark is the foundation of great enterprise and the principal grounds for success. A trade mark is any arbitrary word, sign or symbol applied to goods placed for sale on the market. The adoption of a trade mark and the application of the same to the goods immediately creates a common law right therein, which the proprietor may and does hold exclusive to all others. The principal requirement to constitute a right in a trade mark is that the word, sign, or symbol shall be applied to goods placed on the market. One cannot appropriate a trade mark by simply publishing the fact that he or they contemplate the use thereof.

They should place the mark on the goods, or otherwise no right arises. Trade marks are allowed to be registered in the United States Patent Office upon the payment of the government fee of \$25 and filing certain fac-similes and an application. They are registered for thirty years, with the privilege of a renewal for like periods upon the payment of the fee required.

It will be seen that a trade mark protection is practically unlimited as to time. There have been some thirty-odd thousand trade marks registered in the Patent Office and the number of yearly registrations is continually increasing, which illustrates the fact that the community is becoming more convinced that trade mark protection is of great importance and very beneficial to the proprietors.—*Hardware and Metal Review.*

\* Abstract of paper published in *Ztschr. f. Klin. Med.*, from the *Medical Chronicle* for August.