skies on a clear night and if in possession of a few measuring instruments (without lenses, of course) could at once check and follow his reasoning.

As it seemed odd to me that no translation of this work existed in English, I queried two publishing houses in the matter, one the house of Putnam, which has brought out the books in the Loeb library, the other, the Harvard University Press. Messrs. G. P. Putnam's Sons wrote, August 19, 1925, through Mr. Ben Ray Redman:

> I have read with great interest your letter regarding the possible translation of Copernicus' "De Revolutionibus Orbium Coelestium" and regret to inform you that the publication of this work could not be undertaken at the present time with any hope of commercial success—at least by a general publishing house. If this epoch-making book has never before been translated into English, it seems to me that one of the university presses would be glad to bring it out and to secure for it the distribution which it deserves.

Some correspondence passed between the Harvard University Press and the present writer. Their attitude was most courteous, but on October 30, Mr. Harold Murdoch, director of the Syndics, wrote that on October 22 that Board had "regretfully decided that it would be unwise for us to attempt the publication."

It may be of interest to state that when this book was placed on the Catholic Index as a prohibited book (in 1616) a list was drawn up of the changes which might be made in the book to render it safe for the faithful to read. It is a curious and unintended eulogy of the scientific character of the book that, with the exception of the passages where Copernicus sums up his conclusions, little beyond verbal changes were needed elsewhere to make the work read as a hypothesis rather than a thesis. It is now beginning to appear that the motive for this condemnation was largely to exhibit the Catholic Church as quite as orthodox about the biblical cosmogony as the sectaries. Actually, of course, the obvious earth and heavens of the Old Testament are of far cruder type than either the conceptions of Ptolemy or Copernicus, but this was a fact which neither Catholics nor Protestants could well concede; and Copernicus' book remained forbidden till 1835, when it was silently removed from the Index Librorum Prohibitorum.

DREW BOND

MT. VERNON, N. Y.

A PLANT NEW TO THE UNITED STATES

WHILE visiting a beekeeper at Mesilla Park, New Mexico, in January, 1925, I was impressed with his description of a plant on which his bees worked freely. Being unable to decide what it might be from his description and no plants being available at that time of year, he promised specimens the following summer. When they came, I did not recognize the plant and passed it on to Dr. William Trelease, of the University of Illinois, for identification. Trelease was just leaving for an extended absence and again passed it on to Dr. Paul Standley, of the National Museum, who has specialized in flora of the southwest.

To the surprise of everybody interested he identified it as Syrian bean-caper, *Zygophyllum fabago,* which had not previously been known to occur in this country. From local reports the plant has become naturalized over a considerable area of the neighborhood in which it is found and is the source of considerable honey in the particular apiary which first brought it to attention. No one has so far offered any explanation of its presence.

FRANK C. PELLETT

HAMILTON, ILLINOIS

MILLING AND BAKING QUALITIES OF OLD WHEAT

A FARMER living near Junction City, Kansas, presented in August, 1925, to the Kansas State Agricultural College a sample of wheat which he knew to be at least twenty-five years old. The wheat was dark red, the kernels were plump, well preserved and there was no evidence of weevil. The test weight as received was 55.8, and after passing the cleaning separator it was 56.3. A germination test made in the seed-testing laboratory showed no signs of life. A milling test gave a normal amount of flour, but the ash was high. The amount of moisture and protein in both the wheat and flour compared well with the average generally obtained from a normal Kansas hard wheat. The baking test produced a loaf of small volume, heavy texture and poor color. The bread was very similar to that made from wheat which has been injured by heating in the stack or bin or when germination has proceeded too far. The gluten washed from the flour was also similar to that obtained when wheat has been injured as mentioned.

DR. C. O. SWANSON

DEPARTMENT OF MILLING INDUSTRY,
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SCIENTIFIC BOOKS

Chemistry in Industry. In two volumes, edited by H. E. HOWE. *Chemistry in Agriculture.* In one volume, edited by JOSEPH S. CHAMBERLAIN and C. A. BROWNE. The Chemical Foundation Incorporated.

THE Chemical Foundation is an organization which has been described by A. Mitchell Palmer, former United States attorney general and alien property

custodian, in his report to Congress, and by Francis P. Garvan, alien property custodian, in an address to the National Cotton Manufacturers' Association, issued in pamphlet form in 1919.

The principal purpose of the formation of this corporation was to administer in a sane and useful way the various patents relating to the chemical industry which came into our hands as the result of the war with Germany, so that these patents could be used in a way to benefit American industry to the greatest extent possible. The following statement from Mr. Palmer's report is illuminating:

> These patents undoubtedly include the results of the research upon which must be based the manufacture of any new dyes which the Germans are now able to produce and market. Accordingly, at the very least, the institution will be able to protect the American industry for a considerable period, and this should be all it needs. It appears to be the universal view of the more competent manufacturers in this country that, given five years of freedom from German competition, the American industry can hold its own. Probably only a measure such as the embargo which appears to have been imposed by the British and French against all foreign dye importations can furnish this protection to the degree necessary to insure the safety of the American industry; but short of such an embargo, the Chemical Foundation would seem to furnish all the aid that possibly can be given.
>
> At the same time the new institution promises an incalculable benefit not only to the dye and chemical industries but to the whole American manufacturing world. The opportunities which it can offer and the rewards which it can hold out to competent research scientists should far exceed those of any institution unconnected with industry, and it may well, therefore, form the nucleus of the greatest research organization in the country.

In this same publication is contained the address of Francis P. Garvan, who followed Mr. A. Mitchell Palmer as alien property custodian. His address is entitled "The German Menace." At the close of Mr. Garvan's illuminating address, he says:

> Gentlemen, Drs. Albert and Bernstorff reported to their government that America could never establish the dye and pharmaceutical industry in this country, as we lacked the moral power for the creation of such an industry; that here each party pursued its own selfish interests, but nobody kept the whole in mind; that this problem could only be solved through regard for all points of view, and that the conflicting selfishness of this country rendered that solution impossible.
>
> The Chemical Foundation answers this statement with a challenge, and if it can only become the coordinating forum for American patriotism, American sacrifice and American ability, it awaits the issue with serenity.
>
> Gentlemen, we are the boys who stayed at home. True, the reasons seemed sound and sufficient yesterday. But to-day they seem only excuses, ever decreasingly satisfying. It is not enough that with envious tears we cheer their homecoming.
>
> Would they know our admiration, they must sit by our fireside and listen to us teach our children the character-building tales of their sacrifice. Would they know our love, they must lean over the cribs of those little ones and listen to the prayers of gratitude those little lips are lisping in their behalf. Would they know the depth of the realization of our obligations, and the strength of our resolve that they shall not have suffered and died in vain, we call upon their spirits to watch us in this fight. Peace, peace, and there is no peace!

The Chemical Foundation Incorporated is a Delaware corporation, capitalized at $500,000. The original trustees in whom, under the voting trust agreement, the control of the foundation was lodged are: Otto T. Barnard, Hon. George L. Ingraham, Cleveland H. Dodge, B. Howell Griswold, Jr., and Ralph Stone.

The original officers were: Francis P. Garvan, president; Col. Douglas I. McKay, vice-president; George J. Corbett, treasurer and secretary.

The offices of the foundation are at 55 Beaver Street, New York City.

The importance of chemistry to the industries is not a new discovery. Napoleon Bonaparte, while in exile at St. Helena, had as his surgeon and physician Dr. Barry E. O'Meara. Dr. O'Meara was an Irish doctor in the British army. He was delegated by the English authorities to accompany the former emperor to his island of exile and become his personal physician. He was so struck with the intellectual activities of his patient that he kept a complete diary in which each day the conversations he had with Napoleon were written down. On the 16th of July, 1816, he wrote the following:

> One of Leslie's pneumatic machines for making ice sent up to Longwood this day. As soon as it was put up, I went and informed Napoleon, and told him that the admiral was at Longwood. He asked several questions about the process, and it was evident that he was perfectly acquainted with the principles upon which air-pumps are formed. He expressed great admiration for the science of chemistry, spoke of the great improvements which had latterly been made in it, and observed that he had always promoted and encouraged it to the best of his power. I then left him and proceeded to the room where the machine was, in order to commence the experiment in the presence of the admiral. In a few minutes Napoleon, accompanied by Count Montholon, came in and accosted the admiral in a very pleasant manner, seemingly gratified to see him. A cup full of water was then frozen in his presence in about fifteen minutes, and he

waited for upwards of half an hour to see if the same quantity of lemonade would freeze, which did not succeed. Milk was then tried, but it would not answer. Napoleon took in his hand the piece of ice produced from the water, and observed to me what a gratification that would have been in Egypt. The first ice ever seen in St. Helena was made by this machine, and was viewed with no small degree of surprise by the *yam stocks* (a cant name for the natives of the island), some of whom could with difficulty be persuaded that the solid lump in their hands was really composed of water and were not fully convinced until they had witnessed its liquefaction.

In December, 1816, Dr. O'Meara had another conversation with Napoleon in which the science of chemistry was mentioned. He was discussing the European embargo which was established in England in order to deprive France of any trading with a distant world. Speaking of the English command of the sea, he said:

"But your ministers have had false ideas of things. They imagined that they could inundate the continent with your merchandise, and find a ready sale. No, no: the world is now more illuminated. Even the Russians will say, 'Why should we enrich this nation, to enable her to keep up a monopoly and tyranny of the seas, while our own manufacturers are numerous and skilful?' You will," continued he, "find that in a few years very little English merchandise will be sold on the continent. I gave a new era to manufactories. The French already excel you in the manufacture of cloths and many other articles. The Hollanders in cambric and linen; I established the *École Polytechnique*, from which hundreds of able chemists went to the different manufactories. In each of them I caused a person well skilled in chemistry to reside. In consequence, everything proceeded upon certain and established principles; and they had a reason to give for every part of their operations instead of the old vague and uncertain mode. Times are changed," continued Napoleon; "and you must no longer look to the continent for the disposal of your manufactures. America, the Spanish and Portuguese main, are the only vent for them. Recollect what I say to you. In a year or two your people will complain, and say, 'We have gained everything, but we are starving: we are worse than we were during the war.' Then, perhaps, your ministers will endeavor to effect what they ought to have done at first. You are not able," he continued, "to face even Prussia in the field, and your preponderance on the continent was entirely owing to your naval sovereignty; England has played for all or for nothing. She has gained all, effected impossibilities, yet has nothing; and her people are starving and worse than they were during the midst of the war; while France, who has lost everything, is doing well, and the wants of her people are abundantly supplied. France has got fat, notwithstanding the liberal bleedings which she has had; while England is like a man who has had a false momentary strength given him by intoxicating liquors, but who, after their effect, sinks into a state of debility."

I do not know that I can say anything in addition to the value of chemistry in industry to what Napoleon, in this memorable interview, has described.

These three books mentioned above are simply evidence of the fulfilment of the vision of Napoleon Bonaparte. These books are written by a corps of experts. In the first volume the following industries are listed:

"Abrasives," by F. J. Tone, president of the Carborundum Co.

"Alcohol and Some Other Solvents," by D. B. Keyes, U. S. Industrial Alcohol Co.

"Coal, Coke and Their Products," by F. W. Sperr, Jr., chief chemist, The Koppers Co.

"Cotton and Cotton Products," by Thomas C. Law.

"Chemistry in the Electrical Industry," by Buckner Speed, Western Electric Co.

"Some Applications of Electrochemistry," by A. H. Hooker.

"Chemistry in the Fertilizer Industry," by R. B. Deemer.

"Industrial Gases," by Clark S. Robinson.

"Glass, One of Man's Blessings," by Alexander Silverman.

"The Elements of Iron and Steel Manufacture," by A. E. White.

"The Making of Leather," by John Arthur Wilson.

"Nonferrous Metallurgy," by H. W. Gillett.

"Chemistry of Packinghouse Processes," by W. D. Richardson.

"Chemistry in Pulp and Paper Industry," by Maximilian A. Krimmel.

"Perfumes and Flavors," by S. Isermann.

"The Petroleum Industry," by Gerald L. Wendt.

"Photography," by S. E. Sheppard.

"Synthetic Resin," by A. V. H. Mory.

"Chemistry in the Rubber Industry," by W. J. Kelly.

"Chemistry in the Textile Industry," by L. A. Olney.

In the second volume, the following monographs occur:

"Catalysis," by Ellwood Hendrick.

"The Chemist's Contributions to Aviation," by C. W. Seibel.

"Casein," by George H. Brother.

"The Chemical Rainbow," by M. L. Crossley.

"Chemistry and its Application to the Confectionery Industry," by Stroud Jordan.

"Earthenware and Porcelain," by Albert V. Bleininger.

"The Chemistry behind Electric Batteries," by Homer D. Holler.

"Electroplating and Electroforming," by W. Blum.

"Military and Industrial Explosives," by Charles L. Reese.

"Glues and Gelatins," by R. H. Bogue.

"The Chemistry of Inks," by A. B. Davis.

"Lubricants," by William F. Parish.

"Matches," by Hugo Schapiro.

"Paints, Varnishes and Colors," by Henry A. Gardner.
"Portland Cement," by G. A. Rankin.
"Chemistry, Radio and Incandescent Lamps," by Mary R. Andrews.
"Railroad Chemistry," by William M. Barr.
"Rayon, Man-Made Silk," by M. G. Luft.
"Chemistry in Refrigeration," by Frederick G. Keyes.
"Rust-Resisting Metals," by F. M. Becket.
"Soap," by Martin Hill Ittner.
"The Relation of Chemistry to Water Supplies," by W. W. Skinner.

In the third volume, "Chemistry in Agriculture," we find the following monographs:

"Crops and the Soil," by R. W. Thatcher.
"The World's Food Factory," by John M. Arthur and Henry W. Popp.
"Soil Life," by Jacob G. Lipman.
"Where the Nitrogen comes from," by Harry A. Curtis.
"Maintaining Soil Fertility," by G. S. Fraps.
"Cereals," by C. H. Bailey.
"Sugar and Sugar Crops," by C. A. Browne.
"Fruit and Vegetables," by E. M. Chace.
"Fermentations of the Farm," by J. J. Willaman.
"Chemical Warfare to save the Crops," by Andrew J. Patten.
"Agriculture and the Evolution of our Diet," by C. F. Langworthy.
"Vitamins in Human and Animal Nutrition," by R. Adams Dutcher.
"Meat in its Relation to Human Nutrition and Agriculture," by C. Robert Moulton.
"Chemistry as a Guide in Animal Production," by E. B. Forbes.
"The Chemistry of Milk and its Products," by L. L. Van Slyke.
"The Chemist as Detective and Policeman," by B. B. Ross.

In the above list one of the monographs on chemistry in refrigeration is on the very subject which led Napoleon to the luminous description of the value of chemistry in industries. Another one of them, however, is a discussion of fermentations on the farm and, you might add, in the home which is now very much in the limelight in the hearings on prohibition before the Senate committee. One would think that the list was full, but there is yet much to be done before we have a complete chemistry in the form of monographs of all the industries in which chemistry is the leading science. That means practically all.

I have no time here to enter into any particular discussion of any of these monographs. The high standing of the authors, being experts in the very industries about which they write, is a guarantee of the character of this addition to our industrial literature. Expert editorial control of a high order has secured a fair degree of unity of style.

The chemist, of course, has no intention of assuming that chemistry is the only science in industry, but I believe he will be able to maintain, without any serious challenge, that there is no other one science so important in industry as chemistry. Imagine for a moment the condition of our industries if all chemical control were suddenly withdrawn, with no possibility of ever having it restored. An environment of complete paralysis would soon ensue. There would be no further progress in methods of research and of commercial treatment of articles.

In the one industry of pharmacy, I was told recently at Indianapolis, where I was addressing a luncheon of chemists of that city, that Eli Lilly and Company alone employed forty chemists in their research laboratories, and this is only one of the great manufacturing drug firms in this country.

The American Chemical Society now has sixteen thousand members, and there are still many practicing chemists who are not members. If I should say that the total number of persons engaged in chemistry in one way or another in this country was close to twenty thousand, I would not be far from the truth. There is no industry of any kind now extant and flourishing in our country that is not in some way or another connected with direct chemical control. The progress of our industries in extent and in economy is more dependent upon the work of the chemists than of any other group of men. This is fully recognized now by the great captains of industry. When the American Chemical Society celebrated its twenty-fifth anniversary, I had the honor to be the orator of the occasion and took for my subject "The Dignity of Chemistry." I called attention to the fact that too often the chemist was regarded as the hewer of wood and the bearer of water; that he had not attained the dignity in industrial life which was his due. Another twenty-five years have now passed and we see a great change in the standing of the chemist. He has attained his due dignity.

H. W. WILEY
WASHINGTON, D. C.

SCIENTIFIC APPARATUS AND LABORATORY METHODS

THE USE OF ARCS AND OTHER FLUCTUATING SOURCES IN PHOTO-ELECTRIC PHOTOMETRY

IN his paper on the registering microphotometer P. P. Koch[1] describes an arrangement consisting of

[1] P. P. Koch, *Annalen der Physik*, IV, 39, p. 705 (1912).