Like its associate, it is a strictly littoral form and probably does not extend below tidal limits.

Chthamalus stellatus was first described by Poli in 1795 from specimens taken on the coast of Sicily. It is so abundant on some parts of the French coast that Pruvot[1] recognizes a "Chthamalus zone" as one subdivision of the littoral zone. The same species is common upon the southern coast of England, being "in parts, even more numerous than the *Balanus balanoides*," according to Darwin. The other localities listed by Darwin include points as remote from one another as Ireland, China, Oregon, the Red Sea and the Rio Plata. Gruvel[2] likewise includes Iceland and Patagonia, so that the species may truly be regarded as cosmopolitan.

It is surely difficult to explain how this barnacle has been so long overlooked upon our own Atlantic shores. It is hard to believe that the present species has been habitually confused with *Balanus balanoides* by the long succession of field naturalists and systematic zoologists who have exploited the shores of New England for over a century. These men erred rather in the direction of discovering too many new species than in ignoring well-established ones. An alternative explanation is that *Chthamalus* has only recently invaded New England waters, just as we know that various other species have done within recent years. The mollusk *Litorina litorea* and the actinian *Sagartia luciæ* are doubtless the most striking local examples of this phenomenon, though we have strong evidence for a few other cases. From the comparatively small size of the local examples, and their unworn appearance, as compared with the older specimens of *Balanus balanoides*, the writer was at first tempted to think that the immigration had only reached local waters during the present season. He has, however, found a few specimens on stones which had been collected three years ago.

The local examples, in large part at least, seem to belong to the variety "*fragilis*" of Darwin, as did the specimens received by the latter author from "Charlestown" (=Charleston?). A characteristic of this variety is the smooth, delicate appearance of the valves, referred to above as distinguishing local specimens. At Woods Hole, I have found few having the rugosity, the weathered aspect, or even the whiteness of *Balanus balanoides*. Our local representatives of the species are so much darker in color and so much smoother in appearance than the associated *Balanus* as to be plainly distinguishable from the latter, even at considerable distance. Thus the confusion of the two, said to have been commonly made by English collectors, seems incredible here.[3] The largest specimens which I have seen have not exceeded 10 mm. in diameter at the base.

Not being a specialist in the difficult group of Cirripedia, I grant freely the possibility that I have made an error in my *specific* determination. The species in question is, however, a *Chthamalus* in any case, and *C. stellatus* is the only one hitherto listed from the North Atlantic. The interest of its discovery in local waters would not be lessened, but rather increased, if it were shown that we had to do with another member of the genus.

F. B. SUMNER

[1] *Archiv de Zoologie Experimentale et Générale*, Tome V., 1897.

[2] "Monographie des Cirrhipèdes," p. 201.

[3] Of course the two genera are distinguished by much more fundamental characters than mere appearance.

THE SEVENTH INTERNATIONAL CONGRESS OF APPLIED CHEMISTRY

THE Seventh International Congress of Applied Chemistry convened in the Great Albert Hall, London, on May 27 last under the patronage of the King of England.

The vice-patron, the Prince of Wales, accompanied by the Princess, presided. In opening the congress he spoke of the pleasure experienced by His Royal Highness, King Edward VII., in having the congress meet in London and his own appreciation of the significance of the passing of the "rule-of-thumb" period in modern civilization, the close relationship between science and commerce and the important bearing such conferences had in promoting the peace of the world. His remarks were greeted with cheers from the diplo-

matic representatives of the various governments at the Court of St. James, who formed a picturesque background for the royal patrons, and the hundreds of distinguished men of chemical science gathered around and in front from more than twenty of the civilized nations of the world.

Sir Henry Roscoe, the honorary president, offered an English welcome to his colleagues assembled from all parts of the world and thanked the royal patrons for the felicitous manner in which they had inaugurated the conference.

Sir William Ramsay, the acting president, welcomed the foreign representatives in the official languages of the congress, English, French, German and Italian. He emphasized the close relationship between pure and applied chemistry as observed upon the Continent, and the especial need of a fuller realization of the fact in Great Britain and America. He complimented the Italian organization committee of the sixth congress for applying the surplus of the funds to defraying the expenses of a band of Italian students in attendance on the London congress. He concluded his remarks by quoting the motto, "Philadelphia Maneto!"—"Let brotherly love continue!"

These addresses of welcome were responded to significantly in complimentary terms in the following order:

Speaking for America Dr. H. W. Wiley (in "Ustatian") called attention to the fact that, but for what chemistry had done, teeming millions of our globe would be unclad and unfed; the principles of prophylaxis in medical science were mainly due to the services of chemistry; sanitation is applied chemistry; pure food, pure air, pure drink meant pure minds and bodies, prolongation of life and more effective endeavor; and more important than all, chemistry had elevated the morals of man by detecting and exposing fraud.

Professor Armand Gautier (in French) called attention to the rivalry—always friendly and not hostile—of the men of science in France and England, and that in spite of past differences due to political causes, the mutual appreciation of the men of science in the two countries had annihilated those differences and brought them in closer communion than possible through any formal treaties.

Professor Dr. O. N. Witt (in German) anticipated that the present congress would mark a further "advance in the path of international discussion and understanding trodden by our science" and every country was interested in some degree in the subjects of the congress.

Professor E. Patrnò (in Italian) referring to the enthusiasm shown in Rome to accept the invitation to hold the seventh congress in that country which produced Boyle, Black, Cavendish, Priestley, Wollaston, Dalton, Davy, Faraday and Graham. "Even in the busy, noisy, bewildering rush of London life men of science yet know how to find the tranquility and quiet necessary for the investigation and discussion of the most abstruse problems of philosophy and science."

Professor Arrhenius (in English), speaking for the other foreign countries, referred to England as the classical land of applied chemistry and of the application of improved hygiene in London so that it had the lowest death rate among the large cities of the world.

Sir Frederick Bridge, organist to Westminster Abbey, gave a preliminary organ recital and the national anthem was played and sung as the formal inaugural meeting concluded.

The congress was divided into seventeen sections. The titles of the papers presented are of interest, but are omitted on account of lack of space.

It may be remarked here that more or less confusion resulted in some instances when joint meetings of sections were announced. This should be avoided. It also appears to your representative that four days are too few for the best results from such a large congress. It was quite impossible to determine the exact hour at which many important papers were to be presented and only too frequently extremely interesting subjects, more or less allied, were under discussion in different sections.

The social features of the congress were undoubtedly of equal if not greater importance than the papers presented. The English homes were hospitably wide open. Numerous delightful private dinner parties, followed by more numerous receptions, charming garden parties such as only the English know how to give, gave every chance for intimate exchange of ideas. Of the private garden parties reference can only be made to one given by Dr. and Mrs. Ludwig Mond and Mr. Robert Mond on Sunday afternoon, May 30, to which 1,700 tickets were issued. These included the entire Italian delegation, which took advantage of the occasion to present Dr. Mond with a noble bronze in appreciation of his numerous gifts to the art and science of Rome. The garden party was not only complete in the most elaborate detail for the

varied entertainment on a suitable scale for the large company, but was arranged to display some of the exquisite ancient art recovered in Egyptian excavations, the expenses of which were borne by the Mond family. In the adjoining home of Mr. Robert Mond there was perhaps the best exhibition of colored photographs, many taken by him, in any private collection. One also saw there pure nickel and cobalt in various forms, and the various carbonyls of nickel, iron, cobalt and palladium, some shown the first time.

The American Ambassador, the Hon. Whitelaw Reid, gave a dinner to the American commissioners on Whit-Monday evening at Dorchester House, followed by a reception attended by over 1,000 members. Dr. Messel also entertained the American members at tea at the White Hart Hotel, after the visit to Windsor Castle, Wednesday afternoon.

The following general receptions were held:

May 26—Reception by the Lord Mayor and Corporation of the City of London at the Guildhall.

May 27—Reception at the Foreign Office.

May 29—Reception by the London Section of the Society of Chemical Industry at the University of London.

June 1—Reception at the Natural History Museum.

The London ladies' committee did everything for the comfort and pleasure of the visiting ladies. A charming garden party was given by them at the Botanic Gardens, to which the men were also invited. The season was just right for a magnificent display of rhododendrons and laurel.

On Friday evening, May 28, a joint banquet of the congress and the Society of Chemical Industry, which met in annual session the day before the congress convened, was held in the Crystal Palace. Sir William Ramsay, supported by Professor Raphael Meldola, retiring president of the Society of Chemical Industry, presided over the 1,500 ladies and gentlemen present.

The president proposed the toasts, "The King," "Foreign Rulers" and "Our Friends from Abroad." With the last he coupled the names of Nichols, Brauner, Gautier, von Böttinger, Piutti and Hoogewerff.[1]

Dr. Nichols, replying for America, said that he resided in New York, spent his summers in Canada, and was a representative of the Mexican government. As a commissioner of the United States government and the official representative of the American Chemical Society he thanked the hosts for their wonderful hospitality. While the chemist owed much to the world, the world owed much to the chemist and it would owe more before it owed less. In the great problems of the future just about to commence, the building up rather than the pulling down of the universe, the chemists of America would do their share.

Professor Bohnslav Brauner replied in English for the Austrian Imperial Monarchy. Thirty years ago he had studied under the distinguished honorary president, Sir Henry Roscoe, when he was preaching a crusade against the domination of the "rule of thumb" and he rejoiced that the highest in the land now declared that the "rule of thumb" was dead, and the Congress of Applied Chemistry was the one to give it its *coup de grâce*.

Professor Armand Gautier, speaking in French, said that the *entente cordiale* existing between the English and French chemists dated back to the period when Priestley went to Paris, when Lavoisier called Black his master and when Napoleon allowed Humphry Davy to travel in France with his assistant Faraday at a time when every Englishman was forbidden French soil.

Dr. von Böttinger trusted, in German and English, that the congress would not only further the work of science but the amiability and friendship among all nations.

After Professor Piutti had said a few words for Italy, Professor Hoogewerf, of Holland, spoke for the other nations, whose representatives were mentioned later in alphabetical order beginning with Argentina and ending with Turkey. Dr. Hoogewerff referred to the founding of the theory of ions by Faraday, Ramsay's discovery of the noble gases and the recent apparent demonstration of the disintegration of what was formerly regarded indivisible. The sulphuric acid industry had its birth not far from London, the first city to be lighted by coal gas, and the Scotchman, Young, laid the foundation of the shale industry and Perkin began the coal-tar industry.

An elaborate display of fireworks in the grounds of the palace closed the proceedings. Special trains conveyed all to and from the city.

On Saturday morning, May 29, the King re-received a deputation from the congress accompanied by Sir Henry Roscoe, Sir William Ramsay and Mr. William Macnab (honorary general secretary). The following constituted the deputation: Dr. W. H. Nichols (America), K. K. Regier-

[1] The writer is indebted to the official stenographic reports of the Society of Chemical Industry for notes of these speeches.

ungsrat Fred. Strohmer (Austria), Dr. Francis Sachs (Belgium), Mr. Ou Kouanze (China), Professor Léon Lindet (France), Geh. Regierungsrat Professor Dr. Otto N. Witt (Germany), Professor Emanuel Paternò (Italy), Professor Kuhara (Japan), Dr. S. Hoogewerff (Netherlands), N. Tavildaroff (Russia), Professor Pineña y Alvarez (Spain), Professor Arrhenius (Sweden) and M. F. Reverdin (Switzerland).

Four general lectures were arranged in Great Hall of the Imperial Institute. Two short ones on Friday, May 28, were given by Professors Haller and Paternò. The writer was unable to attend these and has not secured either the titles or accounts of the lectures, hence he regrets he can not give abstracts.

On Monday, May 31, Professor Witt gave an admirable address in perfect English on "Evolution in Applied Chemistry." A complete appreciation of the charming lecture requires its perusal in the Transactions, which should appear within the year.

He said that evolution was no longer a working hypothesis in natural science; it had become a way of thinking. One of the best combinations of empiricism and theory was the examination of old empirical industrial processes by the methods and in the light of modern science. Much valuable information had been thus obtained, but what an immense amount of information still remained lying dormant in unread Egyptian papyri and palimpsests! There is a great treasure of industrial experience of the eastern nations, much of which is equal to or superior to that of the western peoples. We know so little about them, and what we do know is from accounts of travelers, who were not chemists. Industries which have benefited by secrets derived from the East are cotton-dyeing, calico-printing, indigo-dyeing and porcelain. A duty of such international congresses is to watch over the intellectual wealth of the past and to collect it before it disappears forever by the adoption of more rapid western methods.

The biological analogy of the influence of environment on the development of industries was dwelt upon. Whenever an industry left its native country, or often even when it moved from one part of a country to another, it had to be remodeled to suit the different conditions. The history of applied chemistry is filled with instances in which the survival of the fittest meant nothing more nor less than a victory for economy. As a whole, progressive economy was not so dependent upon improvement in apparatus as upon the simplification of the fundamental chemical reactions—in other words, upon better utilization of the energy involved.

Only recently have we begun to have a conscience for fuel. The quantity of fuel required to produce the energy for any industrial process was dependent upon the manner in which it was required to do its work. Once smoke was regarded as an evil, then a nuisance, now it is known as a waste, and none had better cause to wage war against it than he who produced it. A smoking chimney is a thief, not only because it carries visible unburned carbon into the atmosphere, but in a majority of cases invisible carbon monoxide and methane, with all the latent energy they contained. Regenerative gas-heating not only prevents smoke, but is a powerful means of economizing heat. The saving of national wealth effected by it might amount to a sum sufficient to pay the aggregate national debts of all the civilized nations. Uncivilized nations were blessed with neither national debts nor heat-regenerating appliances.

Professor Witt closed his lecture by reference to symbiosis and aggregation. As plants and animals of totally different nature and organization combine for joint life and activity with the object of self-protection in the great struggle for existence, so the various forms of chemical industry were essentially dependent upon each other for success and progress. The more varied and numerous the factories, in spite of apparent competition, the more they prospered. Congresses of chemists, such as the one in session in London, represent a modern form of human symbiotic effort. "They proclaimed the great truth that science knew no boundaries and frontiers, that it was the joint property of all humanity, and that its adherents were ready to flock together from all parts of the world for mutual help and progress."

On Tuesday afternoon, June 1, Sir Boverton Redwood gave a lecture upon "Liquid Fuel," which was rich in matter, suggestive, splendidly illustrated and excellently presented.

Upon the invention of the steam engine the days of the windmill and old-time water wheel seemed to be numbered; sailing ships had given way to mechanically-driven vessels; gas-explosion engines and electric power seemed to be driving out the horse, without whose aid at one time it was thought that no civilized nation could exist. In some directions there was a disposition to revert to the old order of things, as shown in the utilization of water powers with improved appli-

ances; inventors were not without hope of utilizing the ocean tides; in fact, several installations do exist where this is done. Some imaginative people held out in the indefinite hope of our securing some unknown form of energy, but dependence upon such an assumption was undoubtedly gratuitous folly. It was therefore of the utmost importance that the strictest economy be practised in the expenditure of our fuel capital and thus postpone a fuel famine, which is of the gravest importance to a country situated as England is. The principal fuels, in addition to wood, coal and petroleum, including natural gas and products obtained from destructive distillation of bituminous shales, are lignite, peat and alcohol.

Reference was made to President Roosevelt's important call for an international conference on the conservation of natural resources that an inventory of the world's supply might be prepared. Attention was directed in this connection to the report of Dr. D. T. Day, petroleum statistician of the U. S. Geological Survey, who has given data to show that at the present rate of increase America's supply of petroleum will be exhausted in 1935, and if the present output were maintained the supply would last only ninety years.

A review of the sources, geological and geographical, of petroleum showed that its distribution is wide, but the world is largely dependent at present upon the United States and Russia. The output could be greatly increased, because up to the present those deposits only which yielded oil suitable for conversion by fractional distillation into lamp oil and the ordinary commercial products of the refinery had been utilized. Now with the more general development of the use of oil for fuels, the heavy forms of oil have become marketable products. In this connection attention was directed to the ease now experienced in pumping the most viscous oils through pipes, which was formerly regarded impossible, by rifling the pipes and lubricating them with a current of water, which travels simultaneously through the grooves.

In this connection it was stated that for most purposes on land the internal combustion engine would before long replace the steam engine, at least for moderate powers. The steam engine furnishes only about 12 per cent. of the energy of the fuel in the form of work, whereas the former engine yields 25 per cent. The Diesel engine even yields 37 per cent. However, according to Sir William White, the introduction of the turbine engine has given the steam engine a new and probably lengthy lease of life.

Liquid fuel possesses the advantages and coal most of the disadvantages. The thermal efficiency, talking in terms of evaporating power for steam, for a pound of oil and a pound of good steam coal, is 17 to 10. On account of increased radius of action for vessels the British Admiralty placed the figures at 18 to 10. Great economy is had in the ready flexibility in the use of oil. In the case of coal, a thick bed of incandescent fuel must be ready and considerable time is necessary to bring this into a condition of active combustion. Clinkers must be removed, labor is involved, and cold air rushes in, which is detrimental to the boiler, besides being wasteful of fuel. In regard to oil, the fueling of a vessel, for example, at sea is a simple matter with a flexible pipe-line. Furthermore, the combustion can be controlled with precision, quickly brought to highest fuel efficiency upon sudden or unusual demand, or cut off entirely. Stoking expenses are cut, and, in the case of locomotives, the stoker can give intelligent assistance to the engine-driver, which is not only of educational value, but a valuable safeguard as well. Attention was directed to the enormous increase in the consumption of oil on the railways in the United States. In 1907 it amounted to 18,885,691 barrels; the length of line operated was 13,593 miles and total length of line covered by oil-burning locomotives 74,197,144 miles or an average of 3,935 miles per barrel of oil consumed. Many large power plants also consume oil fuel in America.

A most spectacular experiment, in the shape of a burning petroleum fountain, was performed as an awe-inspiring illustration of the combustion of liquid fuel, to call attention to the remarkable incident which took place a year ago in one of the Mexican oil fields. A well, 1,824 feet deep, was sunk in a petroliferous formation charged with oil under tremendous pressure. In less than twenty minutes after, the formation was unexpectedly penetrated, the ground around the well began to tremble and fissures, some 250 feet long, appeared. One of these extended under the boiler and, although the fire had been drawn, the gas was ignited. The well burned fifty-eight days, consuming 3,000,000 barrels (estimated) of oil. The flame reached a height of 1,500 feet and at the broadest part was nearly 500 feet in diameter, and was so bright that a newspaper could be read eleven miles away by its light. In addition to the

escaping oil and gas, it was estimated that 1,500,000 barrels of water were discharged per day, and with the liquid about 2,000,000 tons of solid matter, so that ultimately a crater of 117,600 square meters was formed. The fire was eventually extinguished by pumping sand into the crater with centrifugal pumps.

Words of warning were given in regard to the fear expressed by some as to overproduction of oil; also he wished to dispel any illusions as to the displacement of coal by oil, for the latter constituted but a very small percentage of the fuel used, or that would become available; although no one could say how much petroleum was yet to become available, there was not much likelihood that it could ever revolutionize the fuel industry.

In connection with this address it might be mentioned that series of papers were presented before the metallurgy, organic and law sections upon fuel and methods for determining its value, coal-dust explosions, gas-producers, sources of oils, as shale oil, uses of by-products, and the smoke problem. The International Congress on Petroleum met for two days previous to the congress.

The special lecture which attracted most attention was undoubtedly that of Professor A. Bernthsen on "The Utilization of Atmospheric Nitrogen, Particularly for the Manufacture of Air-saltpeter," given in Professor Armstrong's lecture theater. Having directed attention to the importance of soluble nitrogen compounds for fertilizing purposes, tracing the history of our knowledge of the value of nitrogen in plant and animal life, the lecturer said that of the 2,000,000 tons of Chili saltpeter exported annually Germany took one third. Crookes prophesied that the supply of saltpeter would be exhausted before many years had passed, and by 1935 there would be such a demand for wheat that, even if all the ground now available were planted, the yield per acre must be increased from 12.7 to 20 bushels in order to supply it. Twelve million tons of saltpeter would be required per annum in addition to the 1,750,000 now being used. Even if Chili still had 50,000,000 tons of saltpeter in 1935, the four following years would exhaust it.

The nitrogen of the air amounts to about four billion tons. On the basis of the present annual consumption, allowing no replacement, the air contains enough nitrogen to provide fourteen thousand million years' supply of saltpeter. The world's demand increases by about 100,000 tons per annum. Shortly by the process described, and demonstrated on a large scale by the lecturer, that amount would be placed upon the market every year.

The comparative value of ammonium, nitrate and nitrite compounds was dealt with in some detail and reference made to the sources of these classes of compounds.

The different methods employed in the fixation of atmospheric nitrogen may be divided into three groups. First, direct formation of ammonia from its elements, both of which have to be isolated for the purpose. Second, the formation of metallic nitrides and cyanogen compounds, which are subsequently decomposed into ammonia compounds. And third, those methods which aim at the direct oxidation of atmospheric nitrogen to nitrites or nitrates. These methods were discussed from scientific, practical and economic points of view, attention being given especially to the cyanides, nitrolime, "Stickstoffalk."

In the combustion of nitrogen in oxygen, there is an equilibrium for each temperature between the nitric oxide produced and the nitrogen and oxygen, hence the amount of nitric oxide produced at any temperature can not exceed that corresponding to the state of equilibrium for the particular temperature. The following figures give the percentage produced: at 2,200° C. the gases contain 1 per cent. nitric oxide, at 2,571° C. 2 per cent., at 2,854° C. 3 per cent. and at 3,327° C. 5 per cent. Therefore the air must be heated to as high a temperature as possible and the products cooled as rapidly as possible to reduce the decomposition of the nitric oxide to free nitrogen and oxygen to a minimum.

The numerous methods proposed for accomplishing this, especially that of Cavendish, who in 1785 said it could be accomplished by electric spark discharges, were discussed. Particular attention was given to the modern practical processes of Bradley and Lovejoy, Birkeland and Eyde. The original papers, or this lecture, which may be had in printed form from the Badische Anilin- und Soda-Fabrik, should be consulted for the details. The process of his company, as worked out by Schönherr and Engineer Hessberger in 1905, and claimed to be superior to those of Birkeland and Eyde, was then described. This dispenses with magnets used for creating a strong field, which spreads out the flame into the shape of a flat, more or less circular, disc. Schönherr produces his arc inside an iron tube of compara-

tively small diameter, the air passing through the tube and thus coming into contact with the arc. The arc tube contains an insulated electrode at one end, which can serve itself as the second electrode. "The arc, at its formation, springs from the insulated electrode to an adjacent part of the arc tube which is only a few millimeters away, but the air, which is passing through the tube, being preferably introduced with a tangential or rotary motion, immediately carries the end of the arc along the wall of the tube, so that it either enters the tube at a considerable distance from the electrode, or it ends on a special electrode placed for the purpose, say, at the other end of the arc tube."

There are some modifications, which need not be referred to here. A column of arc flame of very high temperature is obtained burning quietly in the axis of the tube and surrounded by air, which is being passed through the tube. Large quantities of electrical energy may be driven easily and safely through a comparatively small tube. The experimental furnaces at Christianssand are fed with about 600 H.P. at 2,400 volts. The larger furnaces of 1,000 H.P. require 40,000 cubic feet of air per hour and have arcs over twenty feet long.

The nitrogen monoxide produced is readily changed to nitrogen dioxid with oxygen and is absorbed by quicklime in the form of briquettes.

Cheap water power is necessary. A factory is in process of construction at Notodden, Norway, to consume 30,000 H.P. and another, with ten turbines, to develop 140,000 H.P. at Telemarken on the Rjukan.

It is of sentimental, but essentially practical, interest that these processes do not participate in the destruction of valuable coal deposits in obtaining the necessary energy, but use "white coal," which with the constant aid of nature, through the principles of evaporation and condensation, may be used over and over again.

As may be seen from the list of papers presented, the subject of nitrogen availability was one to which great attention was given. In looking over the titles of the papers presented it is suggested that the reader later note the formation of international commissions which are to deal with some most important problems. The members of all the various commissions have not as yet been selected.

On Thursday, May 27, many of the sections met for organization.

Sections I. and VII. held a joint meeting at eleven o'clock, when Martin Ullmann presented reports of the International Commission for the Analysis of Artificial Fertilizers and Feeding Stuffs. The following questions were dealt with:

1. "Ueber die Analyse der Rohphosphate."

2. "International Regelung des Kali-Koeffizienten."

3. "Die Methode König zur Bestimmung der Holz-faser."

4. "Ueber Methoden für die Analyse von Stoffen, dienend zur Bekämpfung der Krankheiten des Weins."

Heinrich Fresenius presented the report "VI. Subkommission der Internationale Analysenkommission."

Section II. The president, Ludwig Mond, delivered his address on "The Metallic Carbonyls."

Section III. Sir Hugh Bell, the president, delivered his address.

Whit-Sunday, May 30, was given over to rest by many, sightseeing by others and numerous parties upon the Thames, which was seen in its best splendor, yet the 300 seats reserved each at St. Paul's Cathedral and Westminster Cathedral for members were occupied, some of whom later attended the garden parties of Dr. and Mrs. Mond and Mr. Robert Mond at their homes, and Dr. and Mrs. Thorne at Kew Gardens.

It is interesting to note that sermons were preached from these historic pulpits along the lines of the "Newer Revelation" harmonizing modern scriptural interpretation with the most advanced scientific conceptions. What a jolly lot of excommunications there might have resulted from these eloquent sermons a century ago!

Excursions were arranged as follows:

Friday, May 28—Laboratories Royal Army Medical College, Millbuth.

Saturday, May 29—Excursion to Rothamsted; London County Council Sewage Works; Hampton Urban District Council Sewage Works; Metropolitan Water Board Water Works; London County Council School of Photo-engraving and Lithography; The Photographic Department of the Polytechnic.

Tuesday, June 1—National Physical Laboratory; Laboratories Metropolitan Water Board.

Wednesday, June 2—Biscuit Factory of Peek, Frean & Co. at Bermondsey; Laboratories of the Inland Revenue Department; visit to Windsor Castle by permission of His Majesty the King. Special trains transported a large number to and fro.

Special resolutions were adopted in several sections. In Section I. (Analytical Chemistry) a general definition for the yield of volatile matter in fuels was proposed and carried. "The percentage which is found by subtracting from one hundred the yield of coke obtained, by the method of the American Committee on Coal Analysis (*Journ. Amer. Chem. Soc.*, 21, p. 1122), from 1 gram of fuel in a bright platinum crucible. The yield must always be calculated upon the pure combustible matter."

In Sections IIIa. and IIIb. (Metallurgy and Explosives) it was *Resolved*, "That it is desirable that the International Commission appointed in Rome in 1906 to consider the standardization of tests for the stability of explosives be reappointed till the next congress."

In Section V. (Sugar) a committee, composed of Messrs. Andrlik, Claassen, Herles, Herzfeld, Pellet, Sachs, Saillard, Strohmer and Villavecchia, was elected to carry out the provisions of a resolution for appointing a "committee for standardizing the concentrations of sugar liquors intended for analysis."

A committee was appointed, consisting of Messrs. Dupont, H. Pellet, Fischmann, Sachs, C. Borgrino and Saillard, to take steps towards furthering the movement for obtaining a reduction of the taxes on sugar advocated by MM. Dupont and Fischmann.

A committee, consisting of Messrs. Pellet, Sachs, Strohmer, Herles, Saillard and Herzfeld, was appointed for drawing up the text of a proposition to be put before the International Commission for Unification of Sugar Analyses for making the aqueous method of Pellet for the analysis of beet the standard one.

The International Commission for the Unification of Methods of Sugar Analysis adopted the following: "That a standard table at a temperature of 20° C. be officially adopted by the commission, and that this table be based on the official German table; and, further, that other tables at different temperatures (such as 15, 17½, 20, etc.) be calculated from the standard one, as also one according to the Mohr system at 20°/20°.

In Section VIIIc. (Bromatology) the International Commission on the Unification of Analytical Methods has issued the following account of their proceedings:

La Commission s'est réunie les vendredi 28, samedi 29 et lundi 31 mai a 9 h.m., sous la présidence de M. André.

Elle a arrêté un réglément d'ordre intérieur; puis elle a examiné et approuvé un projet de rapport sur son organisation et ses travaux.

Elle s'est ensuite occupée des rapports sur l'unification des méthodes d'analyse préparés par MM. André, von Buchka, Chapman, Cribb, Lavalle, Schoepp, Mastbaum, Piutti, Vandevelde, Wauters, Wiley (Voir Séance du samedi 29 de la section de bromatologie).

Enfin elle a procedé au recrutement de quelques membres nouveaux et la constitution de son bureau. M. von Buchka a été élu président; MM. Armand Gautier, Thorpe, Piutti, Schaffer, Wauters, Wiley, Wysman, vice-président; M. Vandevelde, sécretaire général.

After a lengthy discussion, in which many took part, this resolution was carried: "That brandy is a product of the distillation of wine, and the term is synonymous with eau de vie de vin."

In Section IX. (Photo-chemistry) R. Namias and L. P. Clerc, by request of the permanent committee of the International Congresses of Photography, laid before the section the provisional program of the fifth International Congress of Photography to be held at Brussels in July, 1910, during the International Exhibition.

R. Namias, in the name of the Societa Fotografica Italiana, of Florence, presented to the section an album containing a large number of photogravures of Messina and Reggio representing the effects of the recent lamentable disaster. These prints constitute the greatest known work of photographic record. The text is printed in four languages, and the publication is on behalf of the institution established to assist destitute orphans.

In Section X (Electro- and Physical Chemistry) it was proposed and carried that a committee composed of the following members—Messrs. Abegg, Bancroft, Bodenstein, Bruni, Carrara, Dutoit, Findlay, Kistiakowski, Lewis, Lunden, Marie, Mourels, Rothmund, Urbain, Walden and Wilsmore—be appointed to deal with the values of physical-chemical constants.

A committee (not yet announced) to deal with the general question of thermochemical notation was also authorized.

The official closing general meeting occurred in the Great Hall of the Imperial Institute, Sir William Ramsay presiding, supported by Sir Henry Roscoe, and presidents of previous congresses present, Professors Witt, Lindet, Gautier and Paternò.

It was announced that 3,000 members had joined the congress with 650 ladies.

Reports of the several sections were presented with the resolutions recommended for adoption. All were approved except those bearing upon certain patent legislation. These were postponed to the next congress.

The following resolutions from the sections were put to the meeting:

Section I.—

1. "En vue d'unifier les méthodes d'analyse et de récherche dans l'essai des essences de produits résineux, le congrès international de chimie appliquée émet le vœu de voir s'établir par les soins de la Section I. un tableau définissant les bases à utiliser dans l'estimation la pureté des sousdits produits et dont l'usage serait fortement recommandé a tous les analystes."

2. "The institution of official methods for agricultural analyses is undesirable, unless subject to periodical revision."

3. "The Seventh International Congress of Applied Chemistry considers that it is desirable to adopt uniform principles in connection with the application of reference tests, and is of opinion that the proposals made by Professor T. W. Fresenius constitute a suitable basis for these principles."

Section IVa. bis. "That the section in future congresses be a separate and independent section entitled Biochemistry, including pharmacology."

Section VIb. "That this meeting, being in sympathy with the suggestion of Professor Lindner to form a central bureau for fermentation organisms, hereby empowers him to write to the council of the Institute of Brewing (London) as to how such a project could be carried into effect."

Section VIIIa.

1. "That the congress requests the various governments to nominate a commission to make researches in collaboration with manufacturers on materials used in the ceramic arts, to encourage the use of substances not containing lead; to restrain the use of lead materials, and to conduct further researches with regard to protective materials for the hygienic use of those engaged in the ceramic industries."

Reports were received from the International Commission for the Unification of Analytical Methods, which body held short sessions on the mornings of May 29 and 31 and June 1, between 9 and 10 A.M. At these certain resolutions were passed, which were communicated verbatim to the general meeting on June 2.

On the occasion of the discussion on brandy a resolution was passed embodying a definition of the word "brandy."

2. In conjunction with Sections IIIa. and XI. "The congress is requested to appoint a committee to impress upon the governments of each country represented at the congress the importance of adopting a uniform law throughout their respective territories regarding the emission of noxious fumes from chemical and metallurgical works and of black smoke from works and factories. The section believes that the abatement of atmospheric pollution will be most rapidly secured by placing the control of all such gaseous emanations in the hands of fully qualified inspectors capable of giving the necessary technical advice to manufacturers. It records its conviction that the dispersal of the pall of smoke covering certain industrial districts in England and elsewhere will be accompanied by enormous benefit to the inhabitants, and will prove an ultimate gain to the manufacturer."

Section VIIIb. "That this meeting of the Pharmaceutical Chemistry Section of the International Congress of Applied Chemistry having received and discussed communications by Messrs. Squire and Caines and MacEwan and Forrester, resolves that it is desirable that an international enquiry should be instituted with a view to securing: (1) greater uniformity in the commercial supplies of potent drugs and the means for determining the same, and (2) approximation in the pharmacopœias of the world to common standards of activity. With a view to advancing these objects this meeting further recommends that the following provisional committee be appointed to enquire and report on the subject to the next meeting of the congress: Messrs. P. W. Squire and F. Ransom (Great Britain), Professors H. Thoms and E. Schmidt (Germany), Professor E. Bourquelot and M. Leger (France), Professors Piutti and Guareschi (Italy), Professors Remington and Rusby (United States), with P. MacEwan (Great Britain and United States) and G. P. Forrester (European Continent) as secretaries. This meeting recommends that the provisional committee shall have power to invite as members with equal rights persons who have interested themselves in this subject, and further that this resolution shall be conveyed to the governments and pharmacopœial authorities who were represented at the Brussels Conference (1902) on the unification of potent remedies."

Section XI.—

1. "That the committees of the various countries party to the International Convention for the Protection of Industrial Property be requested to consider the desirability of adopting the following provision: 'The manufacture in one country of the union protects the patentee against the revocation of his patent in all countries of the union.'"

2. "The section recommends the question raised by M. de Laire's paper on 'The International Patent' to the attention of the International Association for the Protection of Industrial Property and to the national committees for study with a view to future congresses."

3. "That international committees be appointed representative of all the nations party to the Congress to consider and draft proposals for joint international patent and trade mark legislation, with a view to international uniformity, such proposals to be laid before the congress of 1912 for discussion and further action."

4. "That the congress deprecates any patent legislation limiting the patentability of pharmaceutical products."

5. "To commit the question of international acknowledgment of the right of prior use within the states adhering to the International Convention to the International Association for the Protection of Industrial Property for further consideration."

6. "That the congress expresses the wish that there should be created an 'international depôt de plis cachetes.'"

7. "That it is necessary that a fancy name designating a medicinal compound of definite composition should be protected as a trade mark as securely as such a name applied to a secret remedy or a remedy of indefinite composition."

8. "It is desirable that all manufacturing countries, notably Germany, Great Britain and the United States, adhere to the Madrid Convention concerning international trade-mark registration, and that this arrangement should be raised at the next conference in the sense that: (*a*) registration of a trade mark at the Berne Bureau should only have a formal effect; (*b*) that the deposit at the Berne Bureau be independent of registration in the country of origin."

9. "That an international commission be appointed for the study of technical rules defining requisites, to which should correspond the principal chemical products commercially known as commercial products."

10. "That the work of this commission should be considered as part of the work of the Congress of Applied Chemistry."

11. "That a subsection dealing with the chemistry of petroleum should, in the future, be a subsection of the congress."

12. "That an international commission be appointed to establish uniformity in the control of the escape of noxious gases."

13. "That each succeeding Congress of Applied Chemistry do examine and report upon the progress and position of chemical industry in each of the countries party to the congress, having particular regard to the country in which the congress is for the time being held, and to the relation between the development of chemical industry and customs' tariffs."

Monsieur Lindet proposed that the International Commission on Analyses be continued with a grant of 2,000 frs. It was approved.

The Hon. Whitelaw Reid, the American Ambassador, at the request of the American delegates, presented the official invitation of the government to hold the eighth congress in 1912 in this country. After reading and submitting the instructions of the Secretary of State, the Hon. P. C. Knox, to the American commissioners, Mr. Reid made a most felicitous speech, insisting upon the acceptance of the invitation. There were reasons why the delegates to that congress should feel at home in the United States. One large section of that great country was called New England. There were many large sections of it which might properly be called New Ireland. (Laughter.) Certainly the people in those sections had shown great capacity for self-government and for governing the Americans. (Laughter.) There were also many sections which might properly be called New Germany, and a whole region in the northwest that might be called New Sweden and Norway. The historic claims of the Dutch in America were commemorated in New Amsterdam, and the Italians, who discovered the country, would find many of their countrymen still there to welcome them. (Cheers.) The delegates, if they accepted his invitation, would go next to a country which looked especially on the work of science as, above all, tending to promote happiness and diffuse peace among the nations of the earth. (Cheers.)

Dr. Wiley, of the Department of Agriculture, Washington, seconded the invitation, and said that

according to the last census over 10,000,000 of the citizens of the United States had been born in foreign lands. Thus, an eighth of the whole population of the United States were foreigners who had been received into citizenship. The delegates of every nationality could count upon being welcomed in their own tongue.

Professor Meldola, representing the Society of Chemical Industry, in supporting the invitation, said it was the first time in the history of the congress that the delegates had received a direct message from the ruler of a great nation asking them to meet in his country. (Cheers.)

The invitation was accepted with acclamation.

The president then proposed Professor E. W. Morley as honorary president and Dr. W. H. Nichols as acting president for the next congress.

Dr. Otto N. Witt seconded the nominations, saying that the success of the past congresses had been due largely to the circumspect choice of presidents, and the nominees presented guaranteed the success of the next.

Dr. Chas. Baskerville, in supporting the nominations, spoke of the appreciation of the teachers of chemistry of the choice, because Professor Morley had been the successful investigating teacher and all teachers of chemistry knew they had no better friend than that captain chemical technologist, Dr. Nichols.

The nominees were elected with acclaim.

Dr. Nichols made a modest speech of acceptance and assured the congress of a cordial reception on the part of all Americans.

Dr. Wiley proposed that the official delegates from the United States be nominated members of the organizing committee, with power to add to their number. This proposal was seconded by Professor Clarke and carried.

6. The president proposed that a permanent officer (Delégué des Presidents) be appointed by the International Commission of the Congresses of Applied Chemistry. This was passed after Dr. Nichols had suggested that the expense be borne by the succeeding congress in each case. It is intended that this official after publishing the proceedings of one congress take up his residence in that country where the next congress is to be held and there give the organizing committee that aid it may require.

Sir Henry Roscoe proposed, and Professor Carl Duisberg seconded, the following motion: "That all communications to the congress be submitted to an English publication committee, on the understanding that they be judged with perfect fairness and impartiality." It was carried.

The following delegates then addressed the meeting, expressing thanks:

Monsieur Lindet, as president of a former congress; Dr. Francisco P. Lavalle, Argentina; K.K. Regieurungsrat F. Strohmer, Austria; M. Francois Sachs, Belgium; Mr. Ou Kouanze, China; Senor Don Francisco Becerra, Colombia; Dr. Luis E. Mourgues, Chile; Mr. G. A. Hagemann, Denmark; Senor Don C. Nevares, Ecuador; Professor Armand Gautier, France; Geheimer Regierungsrat Professor von Buchka, Germany; Dr. P. D. Zacharias, Greece; M. Nikolaus Gerster, Hungary; Senatore Emanuele Paternò, Italy; Professor Mitsuru Kuhara, Japan; Dr. Hoogewerff, The Netherlands; Mr. Samuel Eyde, Norway; Dr. Hugo Mastbaum, Portugal; Dr. L. Edeleanu, Roumania; Professor N. Tavildaroff, Russia; Professor Marco T. Lecco, Servia; Professor E. Pinerua y Alvarez, Spain; Professor P. Klason, Sweden; Professor Dr. E. Bosshard, Switzerland; Dr. David P. Day, United States.

The president declared the congress closed, after a most successful meeting.

The American commissioners were Dr. H. W. Wiley, chairman, representing the government, with Drs. F. W. Clarke, David T. Day and Allerton S. Cushman; Dr. W. H. Nichols, representing chemical manufacturers and the American Chemical Society; Dr. Francis Wyatt, technical analytical chemist; Dr. Leo H. Baekeland, the American Electro-chemical Society; Mr. Maximilian Toch, chairman New York Section of the Society of Chemical Industry; Dr. Morris Loeb, president of the Chemists' Club; Mr. Albert Plant, the manufacturing druggists; and Professor W. L. Dudley, Vanderbilt University, and Professor Chas. Baskerville, College City of New York, representing the teachers of chemistry.

In addition to the American commissioners, all of whom were present, the following attended from the United States: Mr. E. A. Sperry, Mr. E. R. Taylor, Mr. Carleton Ellis, Dr. E. A. Byrnes, Dr. Walker Bowman, Dr. Jokichi Takamine, Dr. Hugo Schweitzer, Mr. Hugo Lieber, Mr. Henry Wigglesworth, Dr. Bernard C. Hesse, Dr. W. D. Horne, Dr. Arthur M. Comey, Dr. Chas. L. Reese, Dr. E. Gudeman, Dr. H. M. Smith, Dr. R. Kennedy Duncan, Dr. Arthur Elliott, Mr. Wm. J. Evans, Mr. Wm. S. Gray, Mr. I. F. Stone, Mr. David Wesson, Mr. T. J. Wrampelmeier, Dr. W. D. Harkins, Dr. H. B. Hite, and others whose names your reporter did not secure.

Chas. Baskerville