commercial products by processes that involved chemical changes in the constituents of the crude oils, which differed widely in composition. The methods used in the "cracking" processes employed are based on empirical knowledge. Very little is known as to the behavior of the many individual substances, largely of unknown composition, in the complex mixtures used. If the several organizations in the industry would contribute in a cooperative spirit to the support of a laboratory to study fundamentally the molecules of hydrocarbons, the results in time would, without doubt, be of the greatest value. As little as one cent for each ten barrels cracked would yield at least $300,000 annually for such work. It is my opinion that the organization and the research program for such a laboratory could be worked out in a way to ensure successful operation. No attention should be paid to immediate applications of the results of the work, and publication of these results should be unrestricted. The utilization of the findings of the laboratory in developing processes should be undertaken by the cooperating contributors to the enterprise. A part of the available funds could be used in supporting those researches in university laboratories that had to do with aspects of the fundamental problems of the industry.

I have outlined earlier in this address the broadening of the view in regard to research of the men who control the finances of great corporations. The next advance will come when these executives learn to appreciate the dependence of applied science on "pure" science to such a degree that they will see the value of devoting a fraction of earnings—even an almost infinitesimally small fraction—to the support of the "goose that lays the golden egg."

I shall never forget a prophecy made by Elihu Thomson in an address on the electron before the American Academy of Arts and Sciences. He told the little that was known at the time of this constituent of atoms. Foreseeing the possibilities lying in this sub-atomic entity he boldly prophesied that within a few years electrical engineering would be transformed into electron engineering. The prophecy has come true and the lesson to be drawn from it is evident.

The study of the present status of industrial organic chemistry leads to the conclusion that the development of the industry is based on research in which the results of "pure" science has been applied with great success. A stage has been reached which emphasizes the need of a more fundamental knowledge of the chemical units—the molecules—which are used in building up the valuable substances produced by the industry.

SCIENTIFIC EVENTS

BRITISH VITAL STATISTICS

THE registrar-general's "Statistical Review of England and Wales for 1930," according to a summary in *The British Medical Journal,* contains statistics of population, births, marriages and divorces, registers of electors and vital statistics of the British Dominions. A table is given showing the populations of England and Wales, Scotland and Ireland as enumerated at each census from 1821 to 1921, and so estimated for each year 1891 to 1930 inclusive. The number of marriages solemnized in England and Wales during the year 1930 was 315,109, against 313,316 in the previous year. The rate in both years was 15.8 persons married per 1,000 persons living. This rate is the highest recorded since 1921, notwithstanding the present economic depression. Of the total marriages 31 per cent. were solemnized during the third quarter, or more than double the number during the March quarter. This preference for the third quarter has been constant since the beginning of the present century, prior to which the fourth quarter had been the favorite quarter for marriage. It is interesting to observe that 22 males and 699 females married at 16 years of age, the lowest legal age at which marriages may be solemnized, and that while the 22 males married females up to 23 years of age, the 699 females married males of varying ages between 16 and 49 years of age; in only five cases were the bride and bridegroom of the same age. The number of decrees nisi made absolute in respect of dissolution or annulment of marriage was 3,563, an increase of 167 over the figure for the preceding year. The births registered during the year totalled 648,811, an increase of 5,138, though the rate of 16.3 per 1,000 of the population remained the same. This increase in the number of births is probably in consequence of the high marriage rates recorded during the last two years. The proportion of the sexes in the births registered during the year was 1,044 males to 1,000 females, thus continuing the approximate proportion of recent years. There was at the end of the year 1930 a total of 157,948,940 names in the registrar-general's index available to the general public for searches in the registers of births, marriages and deaths. The statistics relating to parliamentary electors give the figures for the 1930 register for England and Wales as 12,101,108 males and 13,629,399 females, making a total of 25,730,507

electors, with increases of 234,314 and 400,400 in the respective sexes over the preceding year.

THE THAYER ORNITHOLOGICAL COLLECTION

WHAT is perhaps the finest private collection of North American birds, nests and eggs has been given to the Museum of Comparative Zoology at Harvard by the owner and collector, John Eliot Thayer, of the class of 1885. The collection, numbering about 30,000 skins and many thousand sets of nests and eggs, includes almost all the rarest North American birds and their eggs.

Mr. Thayer has sent out many carefully planned expeditions in an effort to secure rare specimens. His parties have visited Alaska, northeastern Siberia, the Queen Charlotte Islands, Lower California and northern Mexico. In Alaska one of his parties discovered the nesting place and secured the only surf bird's eggs known to be in any collection.

The bird skins in this collection are said to be beautifully prepared by the most expert taxidermists. One of the examples of this work is an adult male Labrador duck, a species extinct for sixty to seventy-five years. The Thayer specimen, formerly in the collection of Lord Derby, of England, is probably the best preserved bird of the species.

The Thayer collection recalls the fact that the United States once had parrots living within its borders; four specimens of the excessively rare western race of the Carolina parakeet, a species of parrot, from Oklahoma, will be added to the exhibit of extinct birds already on display at the Museum of Comparative Zoology. There is in Mr. Thayer's collection a series of examples of the extinct Eskimo curlew, or "dough bird," and specimens of the passenger pigeon, the bird which once darkened the western plains, extinct now for thirty years.

The bird skins include many collected by Mr. Thayer's expeditions in the peninsula of lower California. The university collections will also be enriched by a group which fills the gaps in the Harvard series from the Queen Charlotte Islands. There is a series of the Imperial woodpecker from the highlands of northern Mexico, and examples of the now rare ivory-billed woodpecker, together with a section of the cypress log in which is the nesting cavity with the set of eggs found there.

The collection of eggs includes ten eggs of the great auk, extinct since 1845. Harvard has now eleven auk eggs, or about one sixth of those known. There are several California condor eggs, almost the only examples of such eggs found in their natural surroundings. Several eggs of that condor have been secured from birds at the Washington Zoological Park, but few in the wild surroundings of the rocky coast where the bird nests. The first two sets of the eggs of the spoonbilled sandpiper ever found are in Mr. Thayer's collection. A set of "knot's" eggs taken by Admiral Peary on his last trip to the Arctic is included.

MEDALISTS OF THE ROYAL SOCIETY[1]

COPLEY MEDAL, AWARDED TO SIR ARTHUR SCHUSTER

SIR ARTHUR SCHUSTER was the first to show the important information to be got by measuring quantitatively the magnetic deflection of cathode rays. He showed how, by combining this measurement with the potential difference which generates the rays, it was theoretically possible to determine without ambiguity the velocity, and the ratio of charge to mass, of the particles constituting the corpuscular stream. We owe to him other almost equally fundamental contributions to the study of electric discharge in gases. Thus he showed that the passage of a luminous discharge put the gas temporarily into a conducting state, due to the presence of charged ions: these ions were able to diffuse into a space screened from the discharge by a wire gauze partition, and they could then be put into evidence by showing the conductivity of the gas under electromotive forces of a fraction of a volt. Sir Arthur was the first to show by experiment that in Crooke's radiometer the reaction was not on the sun but on the glass case of the instrument, thereby connecting the action with the residual gas. He has also made many important contributions to terrestrial magnetism. In spectroscopy he formulated independently the Rydberg-Schuster law. He invented the periodogram method of looking for periodicities in statistical material, a method which has been widely adopted by workers in many branches of inquiry, extending even into economics.

ROYAL MEDAL, AWARDED TO SIR RICHARD GLAZEBROOK

For fifty years Sir Richard Glazebrook has been closely identified with research on physical standards, and particularly electrical standards. For many years he conducted researches associated with the absolute measurement of resistance, current and inductance, and the results of this work are reflected in the present remarkable accuracy of electrical measurements. The name of Sir Richard Glazebrook is also world-known on account of his directorship of the National Physical Laboratory; it is largely due to his influence on the researches at that institution that

[1] Extracts, as printed in *Nature*, from the remarks made by Sir F. Gowland Hopkins, president of the Royal Society, in bestowing the medals of the society at the anniversary meeting on November 30.