mendations, not in a report, but in a Bill, might be conferred upon it. If it is necessary to pass an Act of Parliament to allow of the creation of such a Commission and the giving of such powers, then the passing of such an Act must be the first step. The matter is so important as to justify such procedure. The difficulties with which it is attended, mainly because of the number of departments and interests that are involved, render it almost hopeless to expect that a solution will be found if only the methods regarded as constitutional are available.

PROF. ADOLF VON BAEYER, For.Mem.R.S.

THE announcement in the *Times* of September 8 of the death of Prof. Adolf von Baeyer at Starnberg, near Munich, in his eighty-second year, must have come as a shock to his many pupils in this country. It was known to several of us that he had not been in good health for some years, but the quiet life which he led at his beautiful home on the shores of the Starnberger See seemed to benefit his health so much that his sudden decease, even at his advanced age, was quite unexpected. It is questionable whether any teacher or investigator ever exerted a greater influence on the development of chemical science, and especially of organic chemistry, than Baeyer has done, for not only was he a great teacher whose pupils are to be found in every civilised country, but his researches have also laid many of the foundations on which the amazing structure of modern organic chemistry has been raised. Apart from the interest which always attached to his published work, it is probable that his main influence on chemical thought was due to his magnetic personality and power of imparting to others some of his enthusiasm for discovery.

For many years, and particularly during the period 1880–1900, it was the custom for the large majority of those who wished to come into contact with the later developments of experimental method to attach themselves, for a short time at least, to the laboratories at Munich. The power which Baeyer exercised in connection with the progress of chemistry in Germany can scarcely be better illustrated than by the fact that during these years almost every professor of chemistry in Germany of the first rank was a pupil of Baeyer. Among these we find, for example, the names of E. Bamberger, L. Claisen, Th. Curtius, Emil Fischer, Otto Fischer, P. Friedländer, C. Graebe, L. Knorr, C. Liebermann, Victor Meyer, H. v. Pechmann, J. Thiele, and R. Willstätter.

Baeyer's influence on the development of chemical industry, and especially of the colour industry, was not less remarkable, for in every works were to be found such men as Caro and Duisberg, Homolka and Weinberg, and a host of others who had learnt their chemistry and acquired their methods of research in the laboratories at Munich. If inquiry is made into the reason for the wide influence which Baeyer has exerted on chemical thought, it will be universally agreed that this has been due in the main to his extraordinary enthusiasm for research and the keen joy which he felt and expressed when he had succeeded in producing some new substance of importance which he had probably been seeking for many months, and possibly for years. On such occasions he used to walk about the laboratories beaming with delight and discuss his latest discovery and its probable consequences with his assistants and advanced pupils. His enthusiasm fired the enthusiasm of his hearers, and unquestionably did much to awaken and stimulate the desire to make discoveries and achieve something perhaps of equal importance. Baeyer was essentially an experimenter, and had little real interest in the development of new theories, although some of his views, such, for example, as those on the constitution of benzene, the structure of oxonium salts, the cause of colour in the triphenylmethane series, and the mechanism of the formation of sugar in the plant, were valuable contributions to theory, and his well-known "Spannungs Theorie" was a brilliant conception of real value in connection with stability in ring structures.

It was Baeyer's habit to adjourn to his private laboratory directly after his early-morning lecture, for perhaps an hour, in order to carry out any experiments which had occurred to him after the close of the previous day's work and to discuss the day's programme with his assistant. He would then walk through the research laboratories and talk over any difficulties with those with whom he happened to be working, and with others whose work happened to interest him. Baeyer's custom was to work himself with comparatively few of those engaged in research in his laboratories, and he left to the *Privatdozenten* almost entirely the supervision of the *Doctorarbeiten*.

Unless something of real interest had happened, it was usual for those working with him to tell him at once that there was nothing to report, and, in this way, Baeyer frequently made the tour of the large laboratories so rapidly that he was back in his private laboratory soon after eleven o'clock, and the whole of the rest of the day was spent at his own work. His private laboratory—a large and very well lit room—usually contained, besides one private assistant, some other researcher in whose work he was specially interested, and it was not unusual for such a student to remain in the private laboratory for weeks at a time. Such an experience was, of course, of the utmost value to those who were fortunate enough to enjoy the privilege; in such circumstances it was impossible not to be profoundly influenced by the skill, patience, and resource with which the experimental difficulties of so many intricate problems were gradually overcome. His equipment for research consisted almost entirely of test-tubes and glass rods, and it rarely happened that he used anything larger than quite small beakers and flasks. Large wooden racks containing hundreds of test-tubes were always at hand, and it used to

be said that these test-tubes, after the usual wash, were subjected to a further cleaning, first with alcohol, and then with distilled water. Baeyer always insisted that the occurrence of a chemical change can be more easily observed and its course more closely followed with small quantities of material and the aid of a test-tube and glass rod than by the employment of a hundred grams of substance and large flasks or beakers. That this view was undoubtedly correct is demonstrated not only by the brilliant results which Baeyer himself achieved with such simple means, but even more conclusively by the fact that his pupils, if perhaps reluctantly at first, all ultimately adopted his method of work. There can be no doubt that the discovery and careful characterisation of so many substances, and the publication of so much important work covering such a wide field, would not have been possible had not Baeyer early acquired the habit of working with small quantities of material.

Baeyer's immense power of work is shown by the fact that, until his eightieth birthday, he delivered his usual lectures on five mornings of each week and continued to experiment in his laboratory with his usual unflagging energy. Had the war not robbed him of his private assistant and laboratory staff, it is probable that he would have gone on even longer. He confided to one of his intimate friends that work in the laboratory gave him as much pleasure after fifty years' toil as at any time during his career, and to the last he took the greatest interest in any developments in the domain of natural science which were brought to his notice. It is well known that he viewed with disfavour and apprehension the growing domination of military power in Berlin and Prussia generally, and it was mainly, no doubt, for this reason that he refused to accept the invitation to Berlin on the death of Hofmann.

Adolf Baeyer was born on October 31, 1835, in Berlin, and he spent his early life in the house (242 Friedrichstrasse) of his grandfather, which at that time was a centre of the literary life of Berlin, and it thus came about that Baeyer was brought up in a literary atmosphere. He always referred to this early intimate contact with literature with pleasure, and considered that the love for literature which he acquired in those days was of great service to him throughout his later career. Baeyer's chief interest in these early days seems to have been for botany and in living things generally, and his first contact with chemistry was on his ninth birthday, when his father gave him a copy of Stöckhardt's "Schule der Chemie."

In his "Erinnerungen aus meinem Leben," which he wrote for the celebrations organised in connection with his seventieth birthday, he tells us that he converted a passage in the house into a small laboratory, and there carried out the usual dangerous and unpleasant experiments associated with early youth. It was during this time that he made his first discovery, that of the double salt, $CuCO_3,Na_2CO_3,H_2O$. The activity of the small laboratory does not seem to have been altogether appreciated, and the poet, Paul Heyse, who was a frequent visitor at the house, had reason to protest:

Es stinkt in diesem Haus gar sehr
Das kommt vom Adolf Baeyer her.

When he entered the university Baeyer seems at first to have entirely forsaken his chemical experiments and to have devoted himself to physics and mathematics; but the interest in chemistry soon returned, and in 1856 he entered Bunsen's laboratory at Heidelberg. After studying the methods of analysis in this famous laboratory for a year, he came under the influence of Kekulé, whom he afterwards followed to Ghent, and whom he always considered was his real teacher.

Baeyer obtained the Ph.D. degree in 1858; his dissertation, "De arsenici cum methylo conjunctionibus," presented and printed in Latin, was a difficult and important piece of accurate work and a great achievement for so young an investigator, especially as it was commenced and carried out entirely on his own initiative. In the spring of 1860 Baeyer returned to Berlin and became *Privatdozent* at that university, but in the same year he was appointed teacher in organic chemistry in the Gewerbe Institut, an institution which later developed into the Berliner Technische Hochschule. The foundations of many of Baeyer's most important researches were laid during the next few years, for we find him publishing papers on the uric acid group, mellitic acid, isatin and indigo, the reduction of benzene carboxylic acids, acetylene derivatives, etc., subjects which later developed into the classical memoirs with which his name is so intimately associated. Among the distinguished workers who were attracted to Baeyer's laboratory during this time we find the names of Graebe, Liebermann, Nencki, and Victor Meyer, and it was in 1866 (*Annalen*, cxl., 295) that the method of reduction by distillation with zinc dust was elaborated which enabled Graebe and Liebermann to demonstrate that alizarin is a derivative of anthracene, and thus to proceed with the synthesis of this important colouring matter.

The next stage in Baeyer's career began in 1872, when he was appointed professor of chemistry in Strasburg, and it was here that he numbered among his pupils Emil and Otto Fischer and H. Caro, and produced many papers, of which those dealing with the phthaleins are probably the most important. Baeyer stayed in Strasburg for three years, and then proceeded in 1875 to Munich, where he remained for forty years, and it was in the Munich laboratories that most of his famous researches reached maturity.

It is impossible to mention even the titles of the long series of papers which appeared with such regularity during this long period, and are so well known to every student of chemistry. Mention may, however, be made of his researches on the phthaleins, the reduction of the phthalic acids, the constitution of benzene, indigo and its derivatives, and last, but not least, the researches on the polyacetylene derivatives, which are marvels

of experimental skill and have perhaps never been sufficiently appreciated.

His later researches were concerned with the peroxides, the constitution of Caro's acid, and particularly with the constitution of the oxonium salts and of the coloured derivatives of triphenylmethane, and his last research, published in 1911 together with Jean Piccard, was on the oxonium salts derived from dimethylpyrone (*Annalen*, cccIxxxiv., 208, 224).

W. H. PERKIN.

NOTES.

THE announcement made by the Admiralty on Saturday that "an attack was made on our vessels patrolling the Belgian coast by an electrically controlled high-speed boat" (which was destroyed in the attempt) recalls the various suggestions and experiments made, ever since Hobson's "bottling" exploit at Santiago, to devise an unmanned craft capable of being steered for attack from a safe distance. Brennan's wire-controlled torpedo was a clumsy device compared with the radiotelegraphic control worked out by J. H. Hammond in America, and tested before the present war commenced. There is no doubt that it is possible to construct a craft steered by wireless which will attack and hit a target two or three miles off. The difficulty of seeing the craft at such distances from the steering station can be overcome at night by attaching to it a light directed backwards and invisible from the target. But the main objection to wireless control is that it can be "jammed" by the enemy. To meet this difficulty it has been proposed to use a selenium control actuated by a searchlight. There is little doubt that this can be successfully worked over a range of several miles, but here again the objection is that something must emerge and be illuminated, and that this something is liable to destruction by the enemy. The question resolves itself into one of adaptability to exceptional circumstances. It will be interesting to learn which of the various possible constructions has been adopted by Germany. The Press Association is authorised to state that four electrically controlled boats have already been destroyed. The boat destroyed last week had a petrol engine, was electrically controlled from the land, and was convoyed by an aeroplane.

AN article of considerable length upon the stabilisation of aeroplanes and ships by means of the gyroscope appears in *La Nature* for October 20. The apparatus designed by Sperry for these purposes is described in some detail. The application to the case of ships and the superiority of Sperry's stabiliser to that of Schlick are fairly well known, but the application to the aeroplane is perhaps less familiar and deserves a word of comment. The claims made for the apparatus are that it relieves the pilot of all control except that of the rudder, and that the machine will continue to fly for almost any length of time at the attitude for which the gyro controls are set. But this is also true of an inherently stable machine, and inherent stability can be obtained without any addition of weight and without any increase of head resistance such as that due to the windmills which drive the servo-motor and generator of the Sperry apparatus. The Sperry stabiliser may be of some utility for large aeroplanes used for commercial purposes or long passenger flights, but it is certainly not required for military aircraft. One of the greatest necessities for the military machine is flexibility of control and ability to execute manœuvres, such as looping, spinning and steep nose-diving. For such a machine the Sperry stabiliser is worse than useless; indeed, the construction of the apparatus appears to be such that looping the machine would completely derange the adjustment. The additional weight of the apparatus and the extra head resistance involved are serious drawbacks to its use in any machine, and the great complexity of its mechanism is antagonistic to the best principles of aeroplane design—simplicity and directness of control.

THE Journal of the Royal Society of Arts for October 19 contains an extensive extract from Capt. B. C. Hucks's paper entitled "A Further Three Years' Flying Experience," which was read before the Aeronautical Society last June. This paper is an exceedingly interesting one, coming from such an experienced pilot, and contains many points of scientific interest. Possibly the most interesting of these is the question of flight in a cloud, or when the earth is not visible. Capt. Hucks vividly describes his own experience of such flights, and states that in gusty weather it is exceedingly difficult to keep the machine on a straight path, and that once control is lost it is almost impossible to regain it until out of the cloud. The air-speed indicator and other instruments fitted do not give sufficient indication of the machine's actual motion through space, and Capt. Hucks suggests that some instrument should be fitted which shows a line fixed in space, whatever be the motion of the machine. Such an instrument must apparently depend either on the earth's magnetic field or on gyroscopic action, and the latter seems the more promising. The chief difficulty in designing an instrument of this kind is to render the supporting gimbals sufficiently frictionless, as friction will cause the gyroscope to deviate from its initial position. It seems doubtful if an instrument can be made for continuous use throughout a long flight, but it should be quite possible to design one for intermittent use. The instrument could be set with the gyro axis in some definite direction, such as the vertical, when the machine was flying normally, and then set free when a cloud was encountered. The gyro would maintain its direction sufficiently well for a short time, and could be reset whenever an opportunity afforded. Such an instrument should prove an interesting problem in design for the scientific inventor, and would undoubtedly be a valuable addition to the instrument board on an aeroplane.

WE notice with much regret the announcement of the death on November 4, at forty-five years of age, of Mr. W. Duddell, F.R.S., C.B.E., past-president of the Röntgen Society and of the Institution of Electrical Engineers.

WE regret to announce the death on November 4, at seventy-two years of age, of Sir David C. McVail, professor of clinical medicine in St. Mungo's College, Glasgow, from 1889 to 1906, and author of a number of publications on physiological subjects, especially on diseases of the heart and lungs.

THE following is a list of those who have been recommended by the president and council of the Royal Society for election into the council at the anniversary meeting on November 30:—*President*, Sir J. J. Thomson; *Treasurer*, Sir A. Kempe; *Secretaries*, Prof. A. Schuster and Mr. W. B. Hardy; *Foreign Secretary*, Prof. W. A. Herdman; *Other Members of the Council*, Dr. H. K. Anderson, Sir G. T. Beilby, Prof. G. C. Bourne, Prof. A. R. Cushny, Dr. M. O. Forster, Prof. P. F. Frankland, Dr. J. W. L. Glaisher, Prof. B. Hopkinson, Mr. J. H. Jeans, Prof. W. H. Lang, Major H. G. Lyons, Dr. W. H. R. Rivers, Prof. C. S. Sherrington, Prof. R. J. Strutt, Mr. J. Swinburne, and Prof. W. W. Watts.