Pamphlets and Periodicals in the Library of the American Institute of Electrical Engineers. This catalogue raisonné, in which the late Brother Potamian collaborated with Mr. Weaver was published in two handsome volumes in 1909 and stands as a monument to Mr. Weaver's learning and taste.

It is believed that Mr. Weaver was the first to lay before the late Andrew Carnegie a plan for a home for the engineering societies in New York City which later resulted in the Engineering Societies' Building and the Engineers' Club.

A French scholar and an admirer of French achievements in science and much in French literature, Mr. Weaver was a collector for many years of books, pamphlets and pictures relating to the French Revolution. It is said that few private collections in the United States of books relating to the French Revolution were more complete than his. At one time he wrote about Paris:

> I feel more at home in that city than in any other in the world, on account probably of my first impressions of the real world having been received there.

But Lieutenant Weaver was nevertheless a thorough American. During the Spanish-American war of 1898 he served as volunteer chief engineer on the U. S. S. *Glacier*. In 1915, after his retirement, he was asked to become a member of the Naval Advisory Board, but declined on account of his health.

After taking up his home in Charlottesville Mr. Weaver became at once at home in the scholastic atmosphere of the University of Virginia. It is reported that he was offered a place on the faculty of this university a few years ago. Some time before his death Mr. Weaver gave nearly his entire collection of technical books to the University of Virginia.

An independent thinker, Mr. Weaver was tenacious in adhering to his opinions, although quiet and pleasant in manner and not vociferous in advancing his views. He felt strongly that cultural studies should not be neglected in technical education, and deplored a purely materialistic attitude in schools of engineering.

Mr. Weaver was one of the founders of the Illuminating Engineering Society and also of the American Electrochemical Society. He served for three years as manager of each. He had also much to do with the formation of the Commission on Resuscitation from Electric Shock. He was a member of the Société Internationale des Electriciens and had been honored by the French government as an officer de l'Instruction Publique.

With an acute distaste for public appearances, Mr. Weaver found his greatest pleasure in his home and library. His home life was ideal. In 1900 he married Miss Mildred Niebuhr and the union was blessed with six children. He had been a sufferer from heart trouble and passed away in his sleep.

WILLIAM E. KEILY

STATE GRANTS FOR SCIENTIFIC INVESTIGATIONS IN ENGLAND

A JOINT deputation from the British Medical Association and the British Science Guild waited upon the Right Hon. A. J. Balfour, Lord President of the Council, at the offices of the Privy Council on March 2, to place before him certain considerations with regard to state awards for scientific research.

According to the report in *The British Medical Journal* Sir Watson Cheyne said that the object of the deputation was to bring forward the question of state awards for scientific work after such work had been done. Scientific workers were assisted by scholarships and so forth while doing their work, but after it was done there was at present no provision for them, although, excited by the interest of their investigation, they had often neglected to make any provision for themselves. Moreover, it was the tradition that a scientific man should immediately publish his discoveries, making no attempt to conceal any knowledge in order to secure personal advantage.

Sir Clifford Allbutt, president of the British Medical Association, referred in particular to the conditions under which medical men worked. Those conditions were governed by the very high-standard of ethics

maintained in the profession. No medical man could have honor in the profession if he descended to any kind of direct or indirect advertisement. No medical man was permitted to take out a patent. The large hospitals no doubt gave a field to the clinical worker which might offer considerable indirect reward, but that did not apply to the research worker, who was rather hidden behind his work. He knew men of very high academic attainments working enthusiastically at research who were declining lucrative appointments in order that they might finish —which they never did, of course—their experimental investigations. It was from such disinterested research—not utilitarian nor aimed at sensational or immediate results—that the greatest benefits accrued to mankind. He himself was chairman for some years of the Scientific Relief Committee of the Royal Society. Mr. Balfour would perhaps be surprised if he were to tell him privately the names of the very distinguished scientists who, or whose representatives, came forward to ask for grants in order to tide over a time of great difficulty. It was desirable to attract a great many more potential workers. The field of comparative pathology, for example, lay untilled; at present it offered no reward, direct or indirect. It would be said that the Treasury must be careful about expenditure, but he feared that the expenditure under this head would not be very great. He was afraid that the highest kind of intellectual research was rather scarce, and consequently the demands for grants would not be so heavy as might be anticipated.

Sir Richard Gregory said that in medicine the great experimental work was rarely done by the successful practitioner or consultant. It was carried out in the research laboratories by men who occupied posts carrying only moderate salaries. There was the further consideration that the highest type of worker —the genius—in medicine or any other department of science was precisely the man who was not amenable to control—the free worker who followed up a clue in some department of knowledge to the willing sacrifice of himself. There should be a fund of some kind for making suitable awards, to be considered as payment for results achieved, and not as grants for favors to come. The scientific worker (he added), unlike the worker in literature or art, could not dispose of his achievement to the public for profit.

Mr. Balfour said that he had always been an advocate—even a vehement advocate—of two things which, until quite recent years, the British public had been very slow to realize: the one, that the material progress of mankind depended upon the applications of science, and the other, that there must be pure science before these could be applied. While that was still worth saying even now on the public platform, it was a commonplace to everybody sitting around that table. They were all agreed that the state—which, after all, represented the people of the country and could not be in advance of them by more than a certain amount at any given time—had been backward in the past in its support of science. The only difference among them, if there was any difference, was as to the way in which the stimulus could best be given to those brains in the country best qualified to further scientific research and the subsequent industrial research based upon it. The view of the deputation, as he understood, was that when a man whose opportunities and genius permitted him to work at research had turned out some brilliant discovery the state should give him a reward.

Everybody must feel that the straits to which many distinguished men of science were reduced after devoting their whole lives to research without any desire for pecuniary reward were rather pathetic, and in many cases discreditable. For his own part he thought it most desirable that some remedy should be found. But he wondered how many such people would get the reward under the scheme which in rough outline had been laid before him that day. He thought the truth was that in the case of the very great discoveries, while it was often possible to go back to the individual who started the train which led to the great result, he himself

had not directly produced that result. Faraday did not discover the telephone or wireless telegraphy or a practical method of electric lighting; what Faraday did was to make all those things possible, to lay the scientific basis of them. It was not easy to see how the reward was always or even commonly to be got into the right pocket. The amazing progress which medical science had recently made in stamping out certain forms of zymotic disease was, indeed, a wonderful triumph; but it was very hard to pick out the individuals to whom that triumph was due. If he might put himself in the unfortunate position of a Prime Minister, the difficulty of saying that A. should have the money which was available, or that B. should have it, would be very great, even though he took the best advice obtainable. There would be certain dramatic cases in which the whole public would be behind the Prime Minister in apportioning a particular reward, and yet when the historian came to look back upon the long labors which had made the triumph possible, might not he have to say that the genius to whose intuition and inspiration the achievement was really due had died unrewarded? Did anybody think that Maxwell, for instance, would ever have come in for any share of this parliamentary grant, seeing that his discoveries were such as very few were capable of comprehending in the form in which he gave them to the world? Yet his discoveries lay at the root of much of the subsequent progress in physical science. Sir Clifford Allbutt had pointed out that this was not asking very much from the taxpayer, because the number of people who would actually get the reward was so small. But, looked at from the point of view of the encouragement of research, that meant that a young man, going into research, and surveying the possibilities of reward, would find he had the chance only of one in ten thousand. He might contribute himself as a colloborator to the great discovery for which somebody else, quite properly, got the chief credit. The collaborator, on this plan, got nothing, yet without the collaboration of people not in the first rank could progress be made? Germany had never excelled this country—he would like to use a stronger phrase, but he would be nationally modest—in the production of those geniuses who started original discovery; but it had surpassed this country in the organization of men not of the front rank whom it had brought together in cooperation towards a common end. He did not see how the investigations of a body of cooperative workers could be stimulated by rewarding a few isolated individuals. At any rate, he saw difficulties. Was there not more to be said for some attempt to stimulate research by improving the position of the researchers while they were doing their work? He was told the other day that there were people carrying on research work at Cambridge for a smaller remuneration that the town council of Cambridge paid to its unskilled employees. This showed that there was still a great deal to be done in the way of aiding research while it was proceeding. He agreed entirely with Sir Richard Gregory that while the state might aid research it would only destroy research if it were resolved to control it. The best men would not be controlled. The state was incapable of forming a judgment on the merits of an abstruse physical of physiological inquiry. That must be left to the genius of the men themselves. But he hoped it did not follow that it was quite impossible to combine with that independence of the worker some better reward for the work he was doing. He was afraid, however, that if the Treasury were represented at that assembly, it would say it preferred the original scheme laid before him by Sir Watson Cheyne. The framing of any such ideal scheme would require a great deal of thought.

In conclusion, Mr. Balfour said that while he had spoken for himself alone, he was also there in some sense as representing the Prime Minister, and he would like to add that there was no man living who had shown a greater sympathy with scientific development than Mr. Lloyd George, who had been responsible for some of the greatest advances which had been made in the direction of state aid for

scientific and medical research. When he reported to him what had passed that day, they might be sure the Prime Minister would give it the most sympathetic consideration. He was far from laying it down that the state should not on occasion imitate our forefathers in the case of Jenner and offer a pecuniary reward to some great man of science whose services had been exceptional and whose achievements were obviously his own. But he would not wish that to be a part of the regular system of dealing with discovery in this country. He hoped that what the government had already done would be found to be far greater in its ultimate results than perhaps the public at large, or even men of science, as yet had realized. He feared that they had not been supported as they might have been by men of great wealth in this country. There had been admirable exceptions, but either we had fewer millionaires than the Americans or we were less lucky in them, for there was no doubt that private individuals across the Atlantic had contributed on a scale which did justice to their generosity and was likly to produce great results for the whole world. Probably it was out of the question to hope completely to emulate them, but he did not despair that among the wealthy men in this country some might be found, in addition to those who had already shown themselves generous benefactors, who would do much to aid and stimulate that research into the laws of nature and that application of those laws upon which our main hopes for the amelioration of the lot of the human race must depend.

SCIENTIFIC EVENTS

THE MANUFACTURE OF SYNTHETIC AMMONIA IN ENGLAND[1]

The Ministry of Munitions announces that Lord Inverforth has arranged for the sale of H. M. Nitrate Factory of Billingham-on-Tees to Messrs. Brunner, Mond, and Co., Ltd. The purchasers will form a company to take over the factory, and will be responsible for all outstanding liabilities of the ministry in connection with the project. This factory, the erection of which was commenced early in 1918 by the Department of Explosives Supply, was designed for the manufacture of synthetic ammonia and for the production of 60,000 to 70,000 tons of ammonium nitrate annually.

During 1916 the Nitrogen Products Committee had established a laboratory in premises placed at its disposal in the new Ramsay building of University College, London, and the Committee's research staff, under the direction of Dr. J. A. Harker, was engaged in an experimental investigation of a number of problems relating to nitrogen fixation. Although it was not anticipated that there would be any shortage of supplies of ammonia, yet it was deemed desirable, in view of the special ability of the synthetic ammonia process for the needs of this country, that an experimental study of it should be made forthwith, so that the required information should be available if necessary.

After a year's experimental work, the progress made was considered so encouraging that the Committee decided to establish a moderate-sized technical trial unit, and funds for the purpose were allocated by the treasury. It was hoped, by means of this plant, that a study of the chemical engineering problems could follow upon that already made of the pure chemistry of the reactions involved, but the committee did not suggest the establishment of the process as a war measure upon an industrial scale. In 1917, however, the Explosives Supply Department considered that the position reached in the experiments justified it in recommending the erection of a large works, in substitution for the committee's cyanamide project, and a site at Billingham, some 260 acres in extent, was ultimately chosen for this purpose. But a number of difficulties supervened, and construction was slow, and at the time of the armistice only a few permanent buildings and a number of temporary structures had been erected, though a large amount of plant had been ordered.

The purchasers of the factory now undertake

[1] From *Nature*.