career. On the other hand, employers must be prepared to resort more commonly to methods of research and to engage a larger number of well-educated scientific assistants, to whom they must be willing to offer prospects of a satisfactory career.

In dealing with this question the natural reluctance of many manufacturers to divulge indiscriminately any part of their processes which, rightly or wrongly, they suppose to have a special value, must be recognised. Hence the difficulty of getting them to resort to a university or other laboratory of research outside the works.

Space does not permit us to discuss these points, but there appear to be only two ways out of the difficulty. If the services of highly-trained scientific men are to be utilised more than has been the case hitherto, as must be done if we are not to be out of the running altogether, our manufacturers must not expect to get manufacturing experts direct from the universities, for it is certain that industrial applications of science can only be properly learnt in the works. The plan long ago adopted in Germany, and to some extent in America, consists in engaging thoroughly well-informed young men, usually graduates, for a period of years, at a salary on which they can at least live, while they are learning in practice to apply their knowledge to the business. Future advancement, of course, depends on the aptitude and diligence shown in the first year or two.

The other plan is represented by the scheme of industrial fellowships inaugurated by the late Prof. Kennedy Duncan in connection with the Universities of Kansas and Pittsburgh, as explained in NATURE of October 21 (p. 203). The essence of the idea is that in such an institution as the Mellon Institute at Pittsburgh arrangements of a confidential character can be made whereby the services of one of the fellows working at the institute can be secured, on mutually agreed terms, by any manufacturer who has problems which he desires to investigate with due privacy. All we can do is to await with interest the results of experience gained at Pittsburgh, or try the plan on a smaller scale at one of our own universities. In any case it is certainly imperative that co-operative relations be forthwith established between our universities and the industries which are dependent on science.

THE SUPPLY OF NITRATES.

ONE of the minor misfortunes to the cause of the Allies, coming through no fault of their own, has been the landslide in the Panama Canal, which has interfered with the import of nitrate of soda from Chile by prolonging the time of the voyage. Nitrates are, of course, required in enormous quantities for explosives, but a very considerable amount of nitrate of soda—no less than 100,000 tons per annum—is used in agriculture for manurial purposes. No modern farmer would like to try to do without it; indeed, any increase in food production almost necessarily means an increase in nitrate consumption. Yet Mr. Acland recently stated in the House of Commons that the quantity now in this country, or on the way to it, was only about 30,000 tons.

As yet the situation is not serious. Farmers do not use nitrate of soda until spring-time; February or March would represent the earliest date when most people would apply it to their crops. Further, the Board of Agriculture has already made an arrangement whereby farmers can buy the sulphate of ammonia produced in this country, and formerly exported, at a price not much above the pre-war prices—14*l.* 10*s.* per ton instead of 12*l.* 10*s.* To this extent the situation is relieved, but, nevertheless, no one would care to see the supply of nitrate too much restricted.

There are two ways of dealing with the difficulty. One is to leave it alone, and trust that matters will somehow right themselves before February; the other is to arrange forthwith for a supply of artificial calcium nitrate. This substance was on the market as a fertiliser before the war; it has been tested on the large scale, and is known to give satisfactory field results; its defects have been studied, and a body of experience has been gained which would now prove very useful. But somehow it seems to have disappeared as a fertiliser since the war began. It ought not to prove impossible of manufacture, and in any case the situation ought not to be allowed to develop too seriously before steps are taken to cope with it.

PROF. THEODOR BOVERI.

DR. THEODOR BOVERI, whose death on October 15 was announced in NATURE of November 11, was born on October 12, 1862, and was the successor of Carl Semper in the chair of zoology and comparative anatomy in the University of Würzburg. He received his university education in Munich, where he had the good fortune to be one of Richard Hertwig's first pupils. There he studied natural science and medicine, graduating in both and becoming *privat-docent* in 1887. In 1893 he was called to Würzburg, where, in spite of offers of other appointments, he remained for twenty-two years. In 1913 he declined the post of director of the Kaiser Wilhelm Research Institute in Berlin. Extensions of his overcrowded research laboratories were granted, and he was made "Geheim Rat." In 1905–06 he was rector of the University. He held the membership of many scientific academies. But probably honours and titles had little meaning for Boveri, for, like Semper, he was a very modest man.

Among modern zoologists Boveri occupied a somewhat unique position. Properly speaking, only one of his memoirs, his masterly study of the excretory organs of Amphioxus—which he and Weiss discovered independently—can be described as purely zoological. His other work—and its total is by no means small or unimportant—related mainly to cytology. For research in this field Boveri had a positive genius. To him we owe the first proof, in Ascaris, of the true nature of the

polar bodies of oögenesis as rudimentary gametes. He set up the numerical law of the chromosomes, and adduced cogent evidences in favour of the persistence of their individuality from cell-generation to cell-generation. He discovered the curious "casting-out of chromatin" in Ascaris, and some of his beautiful experiments relate to the history of an organism destitute of maternal attributes, due to the fertilisation of an egg-fragment by one or two sperms. His cytological memoirs, among the classics of the science, are contained mainly in the six published parts of the "Zellenstudien" (1887–1907), in Richard Hertwig's "Festschrift" (1910), and in the magnificent monograph on the development of Ascaris, which he contributed, as one of his pupils, to the "Festschrift für Kupffer" (1899).

ADOLPHE GREINER.

ADOLPHE GREINER, director-general of the John Cockerill Co., Seraing—the foremost steelworks in Belgium and one founded by an Englishman of that name many years ago—and president of the Iron and Steel Institute, died at his residence near Liège on November 20.

Mr. Greiner was born in Brussels in 1843 and was the eldest son of Gustave Greiner, private secretary to King Leopold, the first King of the Belgians. Educated at the University of Liège he obtained the diploma of the School of Mines in 1864, and shortly afterwards was elected to the post of engineer chemist to the Société Anonyme John Cockerill, which was the first steel manufacturing company on the Continent to adopt the Bessemer process. Five years later he was appointed manager of the steel works, and in 1887 he became director-general, a position he continued to fill until his death. He was responsible for the introduction there of the basic process for steel making, and was one of the earliest promoters of the use of blast furnace and coke oven gas for the direct driving of internal combustion engines.

Not only was he one of the most distinguished figures in the industrial life of Belgium, but he played an important part in the development of the iron and steel industries of other countries. Numerous honours were conferred on him during his long career by the sovereigns of his own and other countries. He had been president of all the leading scientific Belgian societies, and as president of the central committee of industrial labour he had rendered important services to the social welfare of Belgium. He joined the Iron and Steel Institute in 1876, was a frequent attendant at its meetings, served for many years on the council, and was elected president in May, 1914. The year previous he had been awarded the Bessemer Gold Medal.

During the siege of Liège in August, 1914, Mr. Greiner remained at his post continually, encouraging with his unfailing spirit the members of his staff and his workmen, and organised means for the alleviation of distress among the large population dependent on his company for employment. In the following months he set on foot experiments in the heating of open-hearth furnaces by means of tar in order to overcome the difficulty of the shortage of gas coal. His results were presented to the Iron and Steel Institute in a short paper in May of this year, and this last contribution will remain as a record of his courage and resource in the midst of many difficulties and adversities. He was a man of large mind and wide sympathies, and towards the members of his staff and the thousands of operatives employed at the works he occupied a kind of patriarchal position, and was ever ready to help any of them from the highest to the lowest with his advice or benevolent assistance.

ANNIVERSARY MEETING OF THE ROYAL SOCIETY.

THE anniversary meeting of the Royal Society was held on Tuesday, November 30, when the report of the council was presented and Sir William Crookes delivered his presidential address, extracts from which are subjoined. In the report of the council particulars are given of the various committees of the society concerned with scientific problems connected with the war. We hope to publish the main part of this account in another issue, together with a description of the work of other committees with like objects. Meanwhile, we give Sir William Crookes's outline of the Royal Society's activities in this direction.

Towards the end of last year a war committee and sub-committees were appointed to consider a variety of questions, including the supply of drugs and other chemicals which hitherto have been mostly imported. It was finally decided that it would be best for the council as a whole to act as a general war committee, the original sub-committees being converted into four sectional committees, which have met regularly throughout the year. A memorial to the Prime Minister was drawn up, directing attention to the urgent need for closer co-operation between those engaged in scientific research and the directors of the nation's industries, and was presented by delegates of the Royal Society and the Chemical Society. The President of the Board of Education has since issued a scheme for the organisation and development of scientific and industrial research, which has met with approval on all sides, and indicates that the Government is ready to give the country a strong lead in the way of recognition of the value of scientific training and work. An important step has been taken in appointing a committee to prepare a scheme for the establishment of a permanent board in collaboration with technical and other scientific societies for the discussion of questions in which joint action appears desirable.

Owing to unavoidable delay in printing, the Royal Society's Catalogue of Scientific Papers has progressed only slowly, and there appears to be no likelihood of its being completed at the present rate until the middle of 1921. The director of the catalogue, Dr. McLeod, who has been indefatigable in his labours, has been obliged by ill-health to retire. It is proposed not to appoint a new director, but to continue the work under the able management of the chairman of the Catalogue Committee, Prof. Silvanus Thompson.