tion of new knowledge as the appreciation of its value, and the necessity of employing scientific methods in all departments of the national executive. We regard the Government scheme as a measure of acknowledgment of the principles of State responsibility and guidance advocated by the guild; and the only regret is that action on these lines was not taken long ago, as it would have been if we had been governed by far-seeing statesmen instead of party politicians. The consequences of Government recognition will certainly be that science will secure increased attention in the thought of the nation generally, and will receive more sympathetic consideration from the industrial world.

The country, as a whole, will be influenced by the lead of the Government. "It appears incontrovertible that if we are to advance or even maintain our industrial position, we must as a nation aim at such a development of scientific and industrial research as will place us in a position to expand and strengthen our industries and to compete successfully with the most highly organised of our rivals." The attitude of mind of the British people, as a nation, towards science, and public estimation and appreciation of its value, must undergo a profound change. It is for the purpose of effecting this change and directing the resulting activity that the Government has established a permanent organisation for the promotion of industrial and scientific research.

The main channels of activity of the organisation, of which the advisory council of seven experts is the most important part, will apparently lie in three directions. First, the advisory council will act as scientific advisers to all Government departments concerned with or interested in scientific research; secondly, the advisory council, with the co-operation of the various scientific societies, will consider the application of science to industry, and will seek to enlist the interest of manufacturers; thirdly, the advisory council will advise the Board of Education as to steps which should be taken for increasing the supply of workers competent to undertake scientific research.

With regard to relations between the manufacturers and the advisory council, it is sincerely to be hoped that the former will lend their utmost assistance to the scheme, which is devised largely in their interests.

On the educational side the work of the advisory council will be of the greatest importance. As has recently been emphasised by Dr. Beilby, "our colleges have two distinct functions to perform, and it is best that this should be clearly recognised, first to allow the future leaders in applied science to come naturally to the top during their training, and secondly, to prepare a large number of well-trained professional men for the organisation and development of industry." How best to secure these two classes of men in adequate numbers, and, more important perhaps, how to induce an adequate number of the right kind of men to enter the chemical profession, will require careful consideration on the part of the advisory council. It may, however, be hoped that the council will not pin its faith too much to bursaries and scholarships, but will rather seek to create inducements in the shape of posts which are adequately remunerated, more highly remunerated certainly than has been the case in the past.

MODERN PROCESSES OF MANUFACTURING HYDROGEN FOR AIRSHIPS.

IN the *Revue Générale des Sciences* for June 15, M. A. Fournois reviews the earlier methods for the preparation of hydrogen for balloons, and describes in some detail the more modern processes for its manufacture, especially those adapted to field use. The large amount required in the present campaigns can be conjectured from the capacity of the latest type of Zeppelin, which is stated to be some 30,000 cubic metres.

Many of the earlier processes now possess little beyond theoretical interest. The well-known zinc-sulphuric acid reaction always presented difficulties in the transport of materials, of which large amounts were required. The dangers attendant to the transport of the acid were largely overcome by absorption with acid sodium sulphate, the solid material being dissolved as required, but some 15 kilos. of the mixture were necessary for the preparation of one cubic metre of the gas.

The electrolytic production was a great advance, although the process was naturally expensive, and only possible at fixed generating stations. When the preparation of chlorine by the electrolysis of salt solutions was developed, hydrogen, being a by-product, was available at a cheaper rate. Such gas must always be supplied compressed in the usual gas cylinders, and here again transport difficulties arose, to say nothing of the dangers inherent to the transport of gas at 150 kilos. pressure into the field. One of the ordinary waggons will carry only some 13 kilos. of hydrogen—a small proportion of the total weight of the load—and this is roughly only one-hundredth of the gas required for an ordinary dirigible.

Naturally therefore great attention has been directed during the last few years to methods of preparation suitable for field use. The most successful of these have been the action of water on calcium hydride (CaH_2) (hydrolite), and the action of caustic soda on ferrosilicon or silicon itself.

Hydrolite is an expensive material—about five francs per kilo.—but the total cost of the outfit for 50,000 cubic metres is given as only about one-third of the cost of the gas in cylinders, one vehicle sufficing for the transport of the hydrolite plant, as against twelve required for gas cylinders. A vehicle carrying six generators gives an output of 500 cubic metres per hour.

In the ferrosilicon process the fine material falls into caustic soda, which is covered with a layer of hydrocarbon oil to prevent frothing. A base plant has an output of 1500 cubic metres per hour; a field plant, comprising two waggons, 400 cubic metres.

Hydrogenite—a mixture of ferrosilicon with dry caustic soda, which only requires addition of water for generation of the gas—has been used in the French service. One cubic metre of the gas is produced from 3 kilos. of the hydrogenite. The German Schuckert process employs silicon alone, an expensive material, and one which requires external heating of the generators.

Two other most interesting processes for the preparation of gas for balloons are mentioned. The decomposition of acetylene in strong steel cylinders by electric sparks is of particular interest by reason of the gas prepared in this way having been used at the Zeppelin factory at Friedrichshaven. The process gave rise to a serious explosion in 1910. The finely divided carbon deposited in the decomposition cylinders is used for the manufacture of printers' ink.

Another process, of Dutch origin, that of Rincker and Wolter, has also been used in Germany. Generators filled with metallurgical coke are blown to incandescence, the air blast shut off, and suitable oils injected until the fall of temperature necessitates a further air blast. In a portable plant described in a recent issue of the *Scientific American*, one waggon carries two generators, with oil tanks, blower, &c.; a second car carries the purifiers. The gas passes through the generators in series, and purification is effected by sulphuric acid scrubbing, and finally by caustic soda to remove carbon dioxide. With highly incandescent coke the gas is stated to be nearly as light as hydrogen; it has some illuminating value, and is also stated to be suitable for use as an auxiliary gas for furnace work.

SCIENCE, MUSEUMS, AND THE PRESS.

TECHNICAL workers in science and in allied fields are accustomed to say that the general Press either pays no attention at all to subjects which they themselves believe to have a very important bearing upon the welfare of the people, and to be if properly treated of great public interest, or that it seizes upon only some isolated facts which are capable of being treated in a sensational way so as to furnish "good copy," but with the result of conveying an erroneous and often harmful impression. It is, we are constantly assured, the fact that newspaper editors really would like to have good and accurate popular articles on various branches of science, both pure and applied. The difficulty in obtaining them is twofold. First, that the ordinary journalist, untrained in special subjects, cannot be expected to see the really essential points or to present them in an accurate manner. Secondly, that the scientific worker generally has far too heavy a touch to appeal to the public. An attempt is sometimes made to bring the journalist and the man of science into co-operation by means of an interview, but in this country, at any rate, the scientific worker is apt to dread personal advertisement, and on the other hand he may not altogether care about giving news or opinions of pecuniary value for another person to take the reward. At any rate the interview generally results in the man of science being made to utter some notable absurdities.

There is, however, another intermediary through which the technical worker can approach a wider public, and that is afforded by the public galleries of our museums, which are coming more and more to rank as educational establishments of prime importance, catering not only for advanced students, but also for school children, and for many who might object to any title so serious as that of students. In so far as the exhibited series of our museums are intended to appeal to this wider and less educated public, they must do so by means of striking objects, attractive installations, and specially prepared labels. To these may be added: printed guides, which are purchased by a very small percentage of the visitors, and in any case are not as a rule written in a style alluring to those who seek amusement rather than instruction; human guides, who may take a perhaps larger but still a small percentage of the visitors round the galleries; and lastly, lectures with the added attraction of lantern-slides, dealing with special portions of the collections.

Many museums, both in Europe and America, are working hard along these lines, and have effected a considerable increase in the number of their visitors. But when all is said and done the proportion of visitors to the number of the surrounding population is indeed a small one. Some American museums claim a proportion as high as 35 per cent., but this, it must be remembered, refers to the number of visits, not to the number of visitors, which is certainly considerably less. Now it is absurd to spend money, time, and trouble in producing an attractive exhibition and then to leave members of the public to find out the fact for themselves. The museums must not be above taking the same steps as are taken by all other caterers for public amusement and instruction. In some form or other the museum must advertise. Here, then, may possibly be found a solution of the difficulty with which we started. Let the museum frankly admit that it must advertise, and let it take the Press for what it is, as the best advertising agent. The Press, on the other hand, welcomes good copy, and in return for that will not in the least mind directing attention to a public non-commercial institution. To accomplish this, the museum should have under the control of the director, a Press department, composed of the best writers on the staff, each of whom should be instructed as part of his official duties to draw up striking articles, not falsely sensational, but none the less abounding in "crispness," "snap," and "go."

Some such course as that just advocated is now being taken by the Smithsonian Institution, which for the past year or two has distributed to the general and scientific Press free articles written in lucid, popular fashion, dealing with all kinds of matters of novel interest in the United States' National Museum, and with other branches of the