ing strains in the vicinity, as may be produced by flame welding.

Thermit welding finds its chief application in work on large sections, such as rails and thick shafts. In welding together the ends of two consecutive rails, for example, the rails are made to touch, and a refractory mould is placed round the two ends. The thermit mixture, consisting of powdered aluminium and oxide of iron, is fired in a crucible by the ignition of a small quantity of a mixture of barium peroxide and aluminium, the reaction resulting in the production of aluminium oxide and metallic iron at a temperature of about 2500° C. The molten mass is run from the crucible into the mould, the quantity being such that the lower part of the rails is surrounded by molten iron and the upper part by the fused alumina. After a short time longitudinal pressure is applied to the rails, which are now at a welding heat, and complete union is secured. After removing the mould, the thermit iron is left adhering to the lower part of the joint and the slag broken away from the upper part. This is now the common method of welding rails, and forms a typical example of the use of thermit.

In comparing the various methods of welding, it may be said that each has its special advantages and is preferable for one kind of work. When a choice has to be made in a case in which the work could be executed by several methods, the user is guided by experience as to which is likely to suit best, and also by cost and convenience. In all instances much depends upon the skill of the welder, and figures showing the strength of welds will not be realised in practice unless the work is carried out by a thoroughly competent workman.

C. R. D.

SULPHURIC ACID AND THE WAR.

MODERN warfare has been described as an affair of mechanics and chemistry. Of course, this is a very partial and incomplete definition, inasmuch as it neglects what, after all, is the paramount factor—the human element. But, given that the human factor is equally potent on both sides, it is certainly true that the belligerent which is most alert and most resourceful in the use of the methods and practical achievements of science will inevitably triumph in the end. The whole conduct of the war shows that our enemies have not been slow to appreciate this fact, and if we have been a little more tardy in learning the same lesson we are rapidly making good whatever leeway we may have lost.

Nothing distinguishes this war more markedly from previous campaigns than the manner in which the scientific knowledge and intelligence of the nation have been enlisted, both in its prosecution and in the repair of its ravages. We have a notable instance of this circumstance in the recently published Report of the Departmental Committee appointed to consider the post-war position of the sulphuric acid and fertiliser trades. Sulphuric acid is indispensable in war; a nation deprived of it, or of certain of the products which can be obtained only by its means, would be helpless in face of its enemies. It required, however, nearly nine months of actual warfare for those in authority in this country to realise the danger of a possible shortage in the supply of the sulphuric acid absolutely essential to the production of explosives, and a small but eminently competent committee of well-known manufacturers was at length appointed to advise the Government in the matter. The result was that the makers of sulphuric acid and its principal users were organised in view of the national emergency. The request that the demands of the explosive factories should receive priority was willingly acceded to, and it is satisfactory to learn that their requirements were fully met.

The enormous amount of sulphuric acid of high strength needed in the manufacture of explosives has, however, led to an extraordinary development in the industry, and to many far-reaching changes which those who are charged with the consideration of questions of what is termed "reconstruction" view with no little apprehension and concern. Concentrating plants on a large scale have been everywhere erected; large oleum plants have been constructed in connection with Government factories, and private manufacturers have been encouraged to extend their chamber plants and to work them continuously and intensively. The result is that the productive power of the country has now reached an amount greatly in excess of the pre-war consumption, and the problem which the Committee has had to consider is how this expansion can be dealt with in view of possible post-war requirements.

If the outcome of the war is to lead to the continued existence of militarism, the Government explosive factories with their contact and oleum plants will have to be maintained, for it is inconceivable that we shall revert to the fatuous policy of letting things take care of themselves, and of not foreseeing and making provision in advance, which prevailed at the outbreak of hostilities. As regards private manufactories of concentrated acid and oleum, it is to be expected that the resuscitation of the synthetic dye industry in this country will continue to absorb an increasing amount of these products. We may hope that it will prove to be one more instance of a superfluity in supply creating a new demand. But, however optimistic one may be in this respect, it can scarcely be doubted that for some time to come the supply will greatly exceed the demand, and that much plant will lie idle and may possibly be "scrapped."

There is at least one new source of sulphuric acid in this country, created by the war, which it is greatly to be hoped will be maintained and extended, and that is the production of acid from Australian zinc concentrates. The manufacture of zinc was instituted in this country before it was started in Belgium and Germany, but it has not been developed here to anything like its proper extent. Although London is the chief zinc market

in Europe, the main production of the metal has been in the hands of Germans, who have also acquired a controlling interest in the Belgian concerns. This fact has, no doubt, something to do with the tenacity with which, under the pressure of Silesian magnates and capitalists, our enemy seeks to retain his hold on Belgium. It is well known that Germany, with the view of maintaining her practical monopoly in the production and distribution of zinc, gained control of the rich deposits of zinc ores in Australia, and that the great bulk of the Australian concentrates found their way to Belgium and Silesia, mainly by way of Antwerp and Hamburg, Germany's own deposits being meanwhile conserved. This is now, happily, a thing of the past, but whether the former condition is to be resumed time alone will show. Meanwhile, the consolidation and development of the zinc industry in this country are not proceeding at the rate which could be wished. The debate in the House of Commons on the Non-Ferrous Metals measure showed plainly enough that there are doctrinaires who are blind to our true economic interests.

There is one outlet for sulphuric acid which is capable of far greater development, and that is in the manufacture of fertilisers, and especially of superphosphates. There can be no doubt that the food shortage in the country, due to our enemy's activities, has had a profound effect on our agricultural policy, and will lead to a permanent increase in home production. This will, of course, necessitate a greatly increased demand for fertilisers, such as sulphate of ammonia, as well as of phosphatic manures. Much ammonia is at present absorbed in the production of nitrate of ammonia, which is needed in the manufacture of munitions. But this ammonia will be liberated after the war, and will be largely converted into sulphate for agricultural use. In the past about 60 per cent. of the sulphuric acid we produced was absorbed in the manufacture of fertilisers, in which there was a considerable, although of late declining, export trade, in addition to the home demands. The changed carrying conditions caused by the war may, if we seize our opportunity, lead to a recovery and possible extension of this export trade, induced, on one hand, by the comparative abundance of cheap sulphuric acid, and, on the other, by the greatly increased demand for fertilisers.

These and many other points are concisely dealt with in the admirable Report of the Committee now before us. It is an eminently businesslike production, commendably short and to the point. It has the merit, too, of being unanimous, and its recommendations are practicable and such as will appeal to practical men. They involve recommendations for (1) providing an outlet for, and generally dealing with, the surplus sulphuric acid which may be expected over pre-war production; (2) for the relief of acid and fertiliser makers from the competitive effect of surplus acid; (3) for improving the status of the technical chemist, for a more systematic study of manufacturing costs, and for the establishment of a strong national association of sulphuric-acid makers. All these are matters which directly affect the interests of the industries dealt with in the Report, and should, and no doubt will, receive the serious consideration of those immediately concerned. Legislation will presumably be required to give effect to certain of the proposals, but there are others upon which immediate action might be taken under existing powers, and although the end of the war is not yet in sight, it is very desirable that no undue delay should occur with respect to them.

T. E. THORPE.

INTERNATIONAL SCIENTIFIC NOMENCLATURE.

IN the *Comptes rendus* of the Paris Academy of Sciences for February 11 there is a manifesto in the form of a memorandum entitled "Observations on Modern Scientific Language" by a number of French men of science, MM. Bigourdan, Blondel, Bouvier, Branly, Douvillé, Guignard, Haller, Haug, Henneguy, Lacroix, Lallemand, Laveran, Lecomte, Lecornu, Lemoine, Maquenne, Emile Picard, Roux, Schloessing, jun., and Tisserand. The writers of this note enter a protest against a tendency they have observed on the part of the younger generation of scientific workers both to neglect literary form in their publications and to introduce new and strange words which are often unnecessary or badly constructed.

It is suggested that youthful authors may perhaps think that the use of outlandish expressions lends an air of learning to their communications, whereas the impression sometimes produced upon the reader is that he has come upon a bad translation of a work originally published in some foreign language.

It is pointed out that, owing to the international character of science, words and expressions which are quite appropriate in one language have been transferred bodily into another language without proper steps having been taken to adapt them to their new home. For example, our words "control" and "to control" have been translated "contrôle" and "contrôler." But "contrôler" means "to register," and, therefore, ought not to be used in the sense of "to regulate" or "to exercise an influence over." The English expression "self-induction" sometimes appears in French papers on electricity in the shortened form of "le self." Even an Englishman would find it difficult to discover the meaning of such an expression, so that a Frenchman may be pardoned if he finds it barbarous.

The writers of the note express the hope that the more closely the bonds between the Allied nations are drawn, the more care may be taken in translating scientific terms and expressions. It is suggested that international congresses and all forms of international co-operation afford a means of "controlling" the international language of science.

Attention is directed to the adjectives "thermostable" and "thermolabile," in the first place