a particular case may be suffering from, and an autopsy may not reveal the cause of death. An important point to decide, so far as practicable, is what voltage is to be regarded as dangerous. As stated above, the resistance of the skin may vary greatly. But, according to Jellineck, 100 to 150 volts may usually be handled with impunity; 200 to 500 volts are dangerous; anything above 500 volts nearly always causes death. It has been said that 0·1 ampere is fatal, but this is probably the upper limit of safety, and many persons, especially alcoholics, are very susceptible. The time of exposure naturally plays an important part, so that a short contact may be innocuous, while a longer one is fatal. This is partly due to the fact that the resistance decreases during the passage of the current, so that more and more is sent through. Cases where one of the mains is earthed are especially dangerous if contact be made with the insulated main. It appears, however, that the electrostatic capacity of a large circuit may render contact with a completely insulated alternating current dangerous.

The precautions to be adopted are detailed in the fifth chapter. These are partly of the nature of notices of danger placed in the neighbourhood of live conductors and instructions to workmen employed where there is risk of contact. All live conductors should, if possible, be placed out of reach, and all parts liable to obtain static charges, such as the outer cases of transformers, should be earthed. Since it is very rare that *both* mains come into contact with the body, a sufficient protection, up to 500 volts, is usually found in insulating gloves and such like. In the case of alternating currents special danger is incurred when the insulation between the primary and secondary coils of a transformer breaks down, or, in general, whenever a low-tension circuit becomes connected with one of high tension. Various methods of automatic connecting to earth, when this happens, are described. The advantages of connecting one main of the secondary circuit permanently to earth are fully discussed, and the means of making good earth contacts pointed out. Where there is a water main this forms the best of such connections.

The final chapter deals with the treatment of accidents. Burns require the usual dressings and present no special difficulties. On the other hand, the numerous effects of the passage of a current through the body make it difficult to know what has actually happened. The most obvious result is a cessation of respiration and of the beats of the heart. It is almost impossible to say which is the primary cause, since either involves the other. But the treatment is the same, namely, artificial respiration applied as soon as possible, without waiting for removal or for the arrival of a medical man. The report of the American Commission on the best method finds that Schäfer's is to be preferred. One of the most important points in its favour is, perhaps, not sufficiently insisted on: that is, that it can be carried on for a long time without fatigue to the operator. The value of this is shown by some of the cases mentioned, especially one in America, where the patient did not recover until artificial respiration had been carried on for six hours. Some other methods of artificial respiration are described, but, with the exception of the old Sylvester method, they are ineffective and so far mischievous, since they waste time during which an effective method might have been used. If compressed oxygen is available, advantage will be gained by arranging that the gas drawn in by inspiration shall consist of oxygen. As concerns the use of apparatus for insufflation of oxygen, in place of the mechanical movement of the chest, they are no doubt valuable, if at hand. But this is rarely possible, and M. Rodet rightly insists that a less effective method may be successful if used at once, where a more perfect one may be useless if it involves only a few minutes' delay.

The heart sometimes enters into fibrillary contraction. If this is the case with the ventricle, no means yet known are capable of restoring it. It seems that a more direct massage of the heart may in some cases be of use, if it can be done without interfering with the artificial respiration. Intravenous injections of saline solutions containing adrenaline may also be given. By this means a better supply of blood to the heart and brain is brought about by the rise in arterial pressure. It is to be remembered that Schäfer's method of artificial respiration involves, more or less, a rhythmical compression of the heart.

But, even when natural respiration has returned, the patient must be watched for some time, since he may cease breathing again and require renewed artificial respiration. He should be kept warm from the first and, after natural breathing has returned, may be given hot coffee. But on no account must liquids be given until that time. Secondary complications, such as paralysis or renal affections, may cause death days or weeks after the accident.

The author concludes that, in any case, prevention is better than cure, and that every means of avoiding the chance of contact with live conductors should be adopted, both for workpeople and for the public in general.

The book is written with the usual lucidity of French scientific works and should be in the hands of everyone likely to have to deal with the results of exposure to electrical currents.

W. M. BAYLISS.

IMPERIAL MINERAL RESOURCES BUREAU.

AS was briefly announced in NATURE of June 7 (p. 289), the Minister of Munitions has appointed a committee to prepare a scheme for the establishment of an Imperial Mineral Resources Bureau, to be located in London. This is obviously the first step towards carrying out the recommendation of the recent Imperial War Conference: "That it is desirable to establish in London an Imperial Mineral Resources Bureau, upon

which should be represented Great Britain, the Dominions, India, and other parts of the Empire," and no doubt both the recommendation of the War Conference and the later action of the Ministry of Munitions were powerfully influenced by the memorandum to this effect drawn up by the technical institutes that are most closely in touch with the exploitation of our mineral deposits and the utilisation of their products. The Ministry of Munitions cannot fairly be accused of undue haste, seeing that it is nearly a twelvemonth since the institutes directed attention to this important matter, which was commented on in the columns of NATURE of October 5, 1916; it is to be hoped that effect will be given promptly and energetically to the findings of the committee, although it is perhaps even more important that the scheme put forward shall be a thoroughly sound one and that it shall deal with every aspect of this very large subject.

The importance of the subject may best be gauged by considering that the number of workers employed in the mines and quarries of the British Empire was at least 2½ millions in 1913, and that the value of the mineral products at the point of their production was about 150,000,000*l.* sterling in the same year. This vast sum represents the value of minerals extracted from Imperial mineral deposits, and this means that the assets of the Empire are diminished by this amount every year; it cannot be too often insisted upon that it is this fact, in respect of which the mineral industry is unique amongst all others—namely, that minerals constitute a wasting asset, which, once taken from the ground, can never be renewed or recovered—that renders the establishment of a bureau to watch over the proper development and utilisation of our mineral resources an imperative necessity. The figure given above refers only to the value of the crude minerals at the mine; it need scarcely be said that the products obtained from, and depending upon, the mineral output are worth many times as much, in the same way that the number of workers engaged in the treatment of mineral products and depending also upon them is far greater than the number above stated, even when only the industries directly connected with the mineral production, such as the metallurgical industries, are considered.

It must, however, not be forgotten that the industries indirectly connected with the exploitation of minerals are very widely ramified, and are so complex that it is not easy to foresee all the results that may arise from any change in the direct treatment of the minerals themselves, and no doubt these considerations will need the most careful study by the bureau. To take an example, it is quite possible that one of the first questions that the bureau will have to consider is the extent to which metalliferous minerals should be smelted in the country of their origin, or alternatively imported as such to be smelted in this country; it may surely be taken for granted that the old blunder of allowing other nations to import our crude minerals and to reap the advantage of treating them outside the Empire will never be repeated. At first sight, having regard to the fact that for some time after the termination of the war there must be a shortage of tonnage, it might seem preferable to smelt, for example, Australian zinc concentrates in Australia, and to ship the smelted spelter to this country; if, however, this principle were carried too far, we might find that the diminished importation of sulphide ores might bring about a scarcity of sulphuric acid in this country, which might easily cripple our chemical industries, or, by affecting the output of sulphate of ammonia, might influence our agricultural production very adversely.

Obviously, if the Mineral Resources Bureau is to be of real value, it must be able to dispose of the fullest possible technical and scientific information, and it ought for this purpose to work in the closest possible co-operation, not only with the Department of Scientific and Industrial Research (which is already doing useful work in encouraging such researches as that now being conducted upon the dressing of ores of tin and wolfram), but above all with the technical institutions devoted to the advance of the mining and metallurgical industries. No doubt the ideal arrangement would be for the bureau and these various institutions all to be housed in one building, so as to be able to communicate with each other with the utmost readiness, and, above all, to have one common library, in which all books, papers, statistics, and information of any kind concerning mineral production should be housed. Such a joint library should be second to none in the world, and given its indispensable adjunct—a competent librarian—all information concerning any aspect of any mineral question should be readily available to anyone interested. Such a collection of all existing information should be one of the first cares of a Mineral Resources Bureau; only those who have been actually engaged in such work know how much time and money are being continually wasted in doing over again work that has already been done, merely because the records are not readily available to any inquirer.

Again, there is probably no industry that is so many-sided as the mineral industry, and therefore none in which there are so many specialists; it is safe to say that such specialists are best known to the secretaries of the technical institutions, who are necessarily in close touch with them, and an intimate co-operation between the bureau and these institutions would enable the former to get the benefit of the assistance of the best specialists in any problem that may arise in the readiest and most effective manner. Finally, it may fairly be hoped that close connection with the institutions, and through them with the men actually engaged in the mineral industries, may save the activities of the bureau from being strangled by official red-tape. The proper development of our mineral resources is of such importance to the future of the Empire that the organisation of this bureau, which could do so much for them if it is properly constituted, will be watched with the greatest anxiety.

HENRY LOUIS.