being the conditions, the wonder is, not that diamonds are found as big as one's fist, but that they are not found as big as one's head. The chemist arduously manufactures infinitesimal diamonds, valueless as ornamental gems; but Nature, with unlimited temperature, inconceivable pressure and gigantic material, to say nothing of measureless time, produces without stint the dazzling, radiant, beautiful crystals I am enabled to show you to-night."

Professor Mourelo, of Madrid, has investigated the preparation of a strongly phosphorescent strontium sulfid. The pure compound shows no phosphorescence, but the presence of a small quantity of alkali seems necessary, and a trace of subnitrate of bismuth is of advantage. When the mass which has been strongly heated is very slowly cooled, it shows after the action of even very little light, a strong phosphorescence. This property is lost on pulverization, but may be restored by long heating with starch.

In the *Zeitschrift für Angewandte Chemie* Th. Bokorny gives the results of a study of the antiseptic action of various substances. A culture medium of half per cent. egg albumen or peptone, with one-tenth per cent. potassium phosphate, two-tenths per cent. magnesium sulfate and a trace of calcium chlorid was infected with the bacteria of decay, and after addition of the substance to be tested, placed for several days in an incubator. Among inorganic compounds silver nitrate and mercuric chlorid have about the same value, 0.002 %, killing all organisms in two days. The antiseptic limit with silver nitrate is 0.0002 %; with mercuric chlorid 0.001 to 0.0002 %. Copper sulfate is nearly as active, 0.005 % killing all organisms in twenty-four hours, and 0.001 % preventing decomposition. Zinc sulfate 0.01 % kills infusoria in eighteen hours, but 0.1 % is not completely antiseptic, while cadmium sulfate toward algæ and infusoria is weaker than the zinc salt, but toward bateria stronger, 0.02 % being antiseptic. Lead acetate and nitrate in 0.1 % solution only delay decay, while it is prevented by the same strength of iron sulfate solution. The fluorids are not strong antiseptics, the limits being for hydrofluoric acid 0.02 %, barium fluorid 0.3 %, aluminum fluorid 0.1 %, calcium fluorid 0.03 %, ferric fluorid 0.06 %, magnesium fluorid 0.05 %. Ammonium fluorid 0.1 % is without action, but sodium fluorid 0.1 % is antiseptic; potassium fluorid is rather more active. J. L. H.

NOTES ON ENGINEERING.

A committee of the British Institution of Civil Engineers, appointed a year ago or more, have reported the following recommendations on steam-engine efficiency, and they have been adopted by the Council:

(1) That the statement of the economy of a steam-engine in terms of pounds of feed-water per I.HP. per hour is undesirable.

(2) That for all purposes except those of a scientific nature it is desirable to state the economy of a steam-engine in terms of the thermal units required per I.HP. per hour (or per minute), and that if possible the thermal units required per brake HP. should also be given.

(3) That for scientific purposes the thermal units that would be required by a perfect steam-engine working under the same conditions as the actual engine should also be stated.

The proposed method of statement is applicable to engines using superheated steam as well as to those using saturated steam, and the objection to the use of pounds of feed-water, which contain more or less thermal units according to conditions, is obviated, while there is no more practical difficulty in obtaining the thermal units per I.HP. per hour than there is in arriving at the pounds of feed-water.

For scientific purposes the difference in the thermal units per I.HP. required by the perfect steam-engine and by the actual engine shows the loss due to imperfections in the actual engine.

A further great advantage of the proposal is that the ambiguous term 'efficiency' is not required.

In the contest which has now been so long

waged over the disputed originality of invention of the high explosive 'cordite,' Mr. Hiram Maxim, one of the contestants, and one in whom his fellow-countrymen in the United States feel much interest, is, for the time at least, defeated. Referring to this important case, one of the English technical journals, *Industries and Iron*, makes the following remarks: "The appeal of the Maxim-Nordenfelt Guns and Ammunition Company against the judgment delivered by Mr. Justice Wright in the Cordite case has been, as was generally anticipated would prove to be the case, against the appellants. The judgment of the Court was couched in somewhat uncompromising language, and it is doubtful whether the Maxim-Nordenfelt Company will consider it advantageous to carry the matter any further. Although the Court is no doubt perfectly right in its definition of the nature of the invention comprised in Mr. Maxim's patent, as against that of Sir Frederick Abel and Professor Dewar, none can deny the fact that Mr. Maxim was the undoubted pioneer in smokeless powders as we now know them, and it will be conceded by most that the recent decision involves a certain degree of hardship. Mr. Maxim's invention of a smokeless powder was not an accidental discovery; he was forced into the course of the investigation he took up by the necessity of procuring a powder which would be suitable for the rapid-firing gun which he had invented. He found that the use of the ordinary powder practically destroyed the utility of his gun, by surrounding it with such clouds of smoke that it was impossible to take aim. Mr. Maxim then deliberately set himself to the purpose of producing a powder which should be almost, if not altogether, smokeless. In this he was absolutely successful, and he has only shared the fate of many other inventors in seeing the fruits of his invention taken away from him through legal technicalities."

A FOREIGN exchange makes the following very unequivocal statement relative to our later systems of procedure in the Patent Office. A recent change in the law prevents any such delay, whether intended or otherwise on the part either of the holders of the patent or of the officer of the Patent Office: "The amazing circumstances which characterized the issue of the Berliner patent, to which is due the controlling interest in the United States of the Bell Telephone Company, have been paralleled by the well-known Bradley patents, which are now creating a good deal of stir among the manufacturers of aluminium and carbide of calcium. In the former case, the patent lay in the Patent Office for a period of no less than thirteen years before it was formally issued to the public. The Bradley patents were similarly interred for nine years before they were resurrected for the purpose of being used against the Pittsburg Reduction Company. It must be a gratifying reflection to those interested in patents and inventions in the United States that the singular course of procedure suggested by the foregoing instances will not be allowed to characterize the American Patent Office much longer. On January next the new regulations come into force, by which it is enacted that the issue of a patent shall be compulsory within a certain definite period from the date of application; and, under these circumstances, it seems likely that the familiar legend 'Patent applied for' on American manufactures will shortly become effete."

R. H. T.

SCIENTIFIC NOTES AND NEWS.

IN view of the International Congresses of Geology and Medicine, meeting in Moscow during the present month, the tenth meeting of Russian men of science and physicians, which was to have been held at Kief during the same month, has been postponed until 1898.

THE President of the local executive commit-