THE ACTION OF COLD ON MICROPHYTES.[1]

PROFESSOR MCKENDRICK, of Glasgow, gave at the recent meeting of the British association an interesting account of the methods of trying to destroy small organisms like bacteria, not as is commonly done by heat, but by cold. It is known that by means of Coleman's cooling machine meat may be kept from putrefying for a considerable time, but in attempting to sterilize a putrescible solution by means of cold, it was found that, though in some cases putrescence was delayed, in no case were the organisms completely destroyed. Organic fluids were exposed to temperatures more than 120° below 0° F., but on thawing they were found to contain living organisms still. Thus the hope of preserving putrescible matter by means of cold—an important economical result—is, so far as investigation yet goes, destroyed. The organisms under cold seem to be in a nearly solid state, though we cannot call it a chrystalline state. In a paste solution the water is chrystallized under cold, the paste remaining spongy. Possibly cold may separate from these minute organisms the water they contain, and this water is again absorbed on thawing. Meat under cold becomes very friable, while yet minute fragments of it show the same microscopic constitution of muscle. It is well known that frogs have been found in blocks of ice and been revived. Frogs have been frozen at 20° F. in about half an hour. On thawing slowly, the animal, in two instances, completely recovered. When it was frozen for longer than half an hour it did not recover; but, though reflex action was gone, there remained some irritability both in nerves and muscles. It was found also that certain vital functions may be arrested by cold, and thus conceivably higher organisms may be kept vitally inert for an indefinite time. Experiments were also tried on warm-blooded animals. A rabbit subjected to a temperature 100° below 0° F. recovered. No temperature lower than 73° below 0° F. has been obtained in free atmosphere.

PRELIMINARY REPORT OF THE COMMISSION APPOINTED TO REPORT ON THE SPANISH EARTHQUAKES.

THE commission appointed by the Spanish government to investigate the Andalusian earthquake of December 25, 1884, has made a preliminary report of its labors and conclusions up to March 7, 1885 (*Terremotos de Andalucía*, Madrid, 1885, 107 p.). This report is based upon a personal examination, which the members of the commission made of the region affected, and upon some thousands of answers received in response to a series of interrogations which were widely distributed. A more detailed discussion of their work is to follow at a later date. This report, however, deals quite fully with the matter in hand, and states conclusions which, although often only negative, are yet of considerable interest. We must be content with presenting here a brief *résumé* of its contents.

Beginning with a statement in seven pages of the theories proposed by various writers to account for earthquakes, classifying them as volcanic or non-volcanic, and attributing them to the internal heat of the earth, to the presence of vapors of high tension, or to the solution of the rocks by subterranean waters; it proceeds to give in seven pages more a description of the orography and hydrography of the two provinces of Granada and Malaga, and then devotes twenty-one pages to the geology of the same district, describing in detail the rock formation, with the location and direction of its principal fault lines.

Coming to the present occasion, a brief discussion of the times observed at different places leads only to the conclusion that the origin is to be sought to the west of Granada and east of Malaga, any exact result being vitiated by the uncertainty of the time data; this being due to the lack of good clocks and to the fact that, in places where much damage occurred, the attention of the inhabitants was pretty thoroughly occupied with caring for their own safety. The area affected is described as limited toward the north by Madrid and Segovia, toward the west by Cáceres and Huelva, toward the east by Valencia and Murcia, and on the south by the Mediterranean; but the tremor of the earth was also indicated by instruments even so far distant as Rome and Brussels. Examination of the direction of the cracks in the ground and in buildings, as well as of the curves of intensity, estimated according to the Rossi-Forel scale, leads to the conclusion that the focus is to be found in the valley of Zafarraya, where the greatest damage was caused.

The latter half of the report is mostly occupied with the phenomena preceding, accompanying, and following the earthquake, such as, changes in the course of streams, perturbations of magnetic apparatus, barometric depression preceding the shock, subterranean noises, dynamic effects, etc. In estimating the amount of damage done, the number of buildings injured in the two provinces of Granada and Malaga is stated as 17,178, of which number 4,399 are classed as totally destroyed. The injured persons were: 745 dead, 1,485 wounded. In discussing the causes of this earthquake, the commission accepts the Italian

[1] From *Nature*.