whirlpool in the centre of the ceiling, in which is figured a cuttle-fish with its outstretched arm.

The council chamber is richly but gracefully ornate, though more orthodox. The large lecture theatre is of excellent Florentine architecture, with fine panels by M. Louis Tinayre, who has accompanied the Prince on board the *Princesse Alice* during several voyages, not only in the Mediterranean and tropics, but also in Spitsbergen. One panel represents oceanographical operations on the deck of the *Princesse Alice*, especially the taking on board of a trawl and a trap from the deep sea. Another represents a whale-boat in charge of the Prince, who is fast to a whale. A third represents the selection of the larger material from the trawl on the deck of the ship, while a fourth pictures finer work being carried out below, inside the scientific laboratory.

The inauguration was presided over by the Prince of Monaco himself, and was graced by the presence of the President of the Republic, M. Fallieres, and many members of the Government, and by Ambassadors and Ministers of Foreign Powers at Paris. There were also the members of the "Conseil d'Administration" and of the "Comite de Perfectionnement." A guard of honour, formed from the Republican Guard, lined the streets outside the building, and the band of the Republican Guard played the "Marseillaise" and the Monagasque national anthem as the President of the Republic and the Prince of Monaco entered the lecture theatre.

The proceedings were opened by an eloquent address by the Prince of Monaco, who pointed out that the opening of the institute was the crowning of the work he had devoted his life to during the last twenty-five years. He then proceeded to give an account of the aims and objects of the museum and institute, which have already been given in the pages of NATURE. Finally, he gave the reason why he had chosen Paris as the seat of the institute, and it is best to quote the Prince's own words in his fine peroration, which left a deep impression on the audience.

"Si j'ai choisi cette capitale pour y centraliser mon œuvre, c'est que Paris a gagne la reconnaissance du monde intellectuel: les lettres lui doivent un rayonnement incomparable, les arts ont chez lui une de leurs plus genereuses patries, la science lui doit l'affranchissement qui ouvre a la pensee des champs sons bornes. Mais c'est aussi parce que certaines âmes demeurent toujours sous l'influence de l'atmosphère où sont nées leurs premières affections et où leurs vieilles tendresses sont mortes; où des peines ont fortifié leur courage et où les contingences de la vie ont orienté leurs efforts.

"Le musée océanographique de Monaco semble un vaisseau ancré sur la côte avec des richesses extraites de tous les abîmes; je l'ai donné comme une arche d'alliance aux savants de tous les pays.

"L'édifice où nous sommes recueillera la quintessence du travail élaboré par l'océanographique qui planera idéalisée sur ce vaste domaine universitaire, au milieu du flot grandissant de la science. Et je le confie à cette ville de Paris qui m'a enseigné le travail et dont l'esprit et le cœur ont si souvent dirigé l'esprit et le cœur de l'humanité entière."

The Prince was followed by M. Maurice Faure, Ministre de l'Instruction Publique, speaking in the name of the Government, who eloquently thanked the Prince on behalf of France and the University for his gift.

Others who spoke were M. Armand Gautier, president de l'Academie des Sciences, and M. Liard, vice-recteur à l'Academie de Paris, as well as M. Perrier, directeur du Museum d'Histoire naturelle.

Finally, M. Henri Bourée, aide-de-camp to the Prince of Monaco, gave some very excellent photographs and kinematograph views of work on board the *Princesse Alice*. These included some very marvellous colour photographs of living invertebrates that had been gathered during some of the cruises—the most striking of which was a brilliant physalia, glittering with translucent violet in the sun. The kinematograph also showed the movement of the physalia in a glass tank. WILLIAM S. BRUCE.

THE OBSERVATORY AT MESSINA.

IN connection with seismological investigations, Italy is the possessor of a prestige which we trust will grow. It was the first European country in which the study of earthquakes received special recognition and Government support. It systematised seismometry, and through M. di Rossi published the *Bollettino del Vulcanismo Italiano*, which, I believe, was the first journal ever issued which dealt specially with hypogenic activities. The work commenced in Italy was extended in Japan, and at the present time every civilised country in the world has established earthquake observatories and recognises the scientific and practical importance of what is now a new science. From the knowledge we now possess of earthquake motion new rules and formulæ for the use of builders and engineers have been established. These have been extensively applied, and we see that the new types of structure withstand violent movements, while ordinary types in their vicinity have failed. The new science has already justified its existence by thus minimising the loss of life and property. A side issue of seismometry has led to the localisation of faults on railway lines and to alterations in the balancing of locomotives. The result of the latter has been to reduce the consumption of fuel.

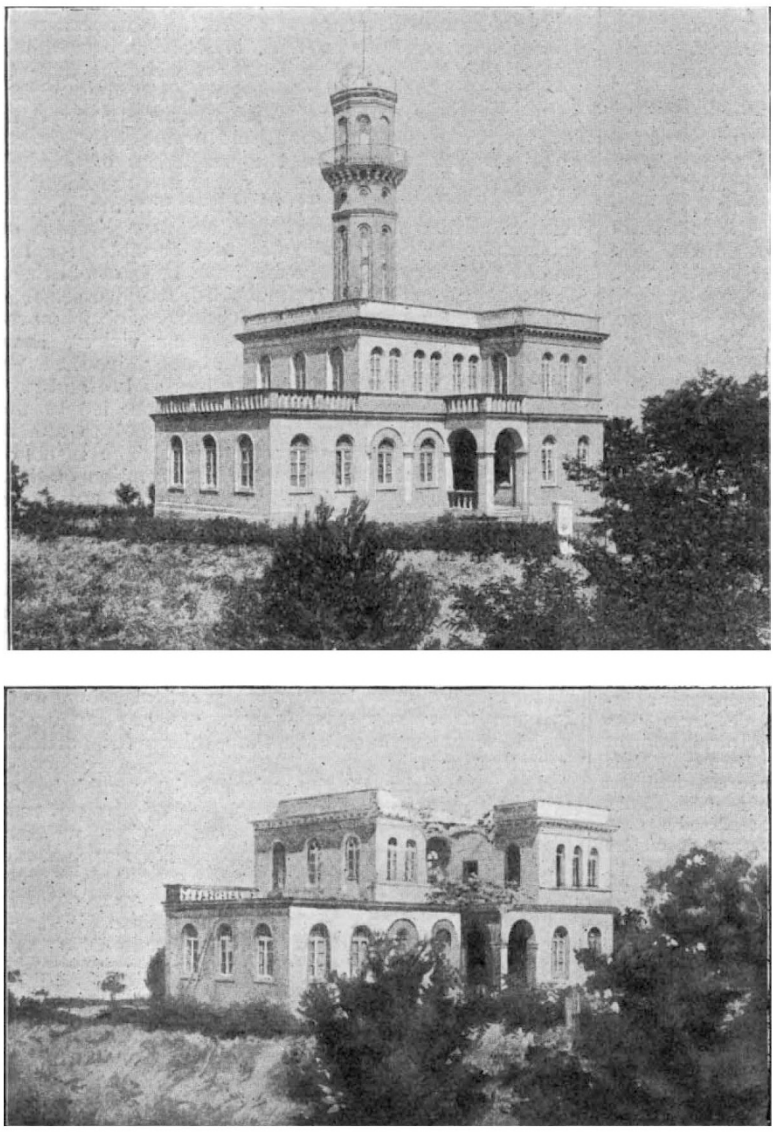
Now we know that in whatever part of the world we live it is possible to record large earthquakes, even if their origins are so far removed as our antipodes. These teleseismic records have increased our knowledge respecting the interior of our planet, thrown light upon the cause of certain cable interruptions, indicated suboceanic regions where depths are changing, and have had a far-reaching importance in many other directions, both scientific and practical. Although we now know that practical seismometry is open to everyone, still there are particular sites which seem more suitable than others for particular investigations.

The popularity of the seismologist would be enhanced if, like the astronomer, he had the power to predict. The latter tells us exactly when we shall see the next eclipse of the moon. We stand outside our door at the appointed time; the eclipse takes place, and we are again reminded of the accuracy of astronomical calculations. Whether the eclipse did or did not occur at the minute specified, so far as the general public are concerned, might not matter very much, but it would matter if the eclipse really meant, as it was supposed to mean in the Middle Ages, a portent of a great disaster. What the public imagine they would like to know about an earthquake is the time at which it might occur. If this could be stated, and at the same time something about the character of the expected disturbance in earthquake districts, seismology would be liberally supported. Astronomers have received the support of nations since the days of astrology, while seismology is in its childhood seeking for more extended recognition, and it is only as this is afforded that the public should look for replies to their difficult inquiries.

Through the Straits of Messina there is a fault or line of faults in the earth's crust, and from time to time, as in 1783, and in 1908, along these, sudden yieldings have taken place. It has been suggested by many seismologists that before such reliefs of strain take place a measurable amount of rock-bending may

be produced; rock-yielding or distortion of this character seems to have been measured in California before the earthquake of 1906, which ruined San Francisco and other towns.

With properly equipped observatories on two sides of the Straits of Messina, the existence or non-existence of such brady-seismical movements might be demonstrated and limits be recognised which preceded a crash. Kövislegethy has suggested other lines dependent upon the hysteresis of rock masses, along which we might conduct investigation which may possibly lead to the prediction of disaster. The dividing line between Calabria and Sicily is a theatre of hypogenic activity, and is a place above all others in Europe to be watched and studied carefully. As a site on which to make investigations respecting certain changes which are taking place beneath our feet it is of importance not only to Italy but to the world. We see from a paper we have recently received that the observatory at Messina in 1908 suffered severely, the disaster being chiefly due to the fall of a tower. The extent of this damage is shown in the accompanying figures. If it is only on account of the unique position of this observatory I feel certain that it is the wish of all seismologists to see it restored and re-equipped to extend its useful work. J. MILNE.



The Messina Observatory before and after the Earthquake of December 28, 1908.

SYNCHRONISATION OF CLOCKS.

DURING the past two years a committee consisting of the following members of the British Science Guild, Sir Hugh Bell, Bart., Hon. Sir John Cockburn, K.C.M.G (chairman), Sir Norman Lockyer, K.C.B., F.R.S., Major O'Meara, R.E., C.M.G. (representing H.M. Postmaster-General), Sir Alexander Pedler, F.R.S., Dr. F. Mollwo Perkin, Prof. J. Perry, F.R.S., Sir William Ramsay, K.C.B., F.R.S., and Mr. St. John Winne, has been engaged upon the consideration of a problem which has often been referred to in the Press, both lay and technical; that is, the question as to how best may be achieved a systematic observance of absolute Greenwich mean time.

The problem is not altogether one affording opportunities for easy solution, for, as stated in the recently published second annual report of the committee, it is apparently beyond the power of human ingenuity to produce two clocks which will go together for one week. Nor is the problem a new one. In past years there have been many endeavours to utilise the services of electricity for the correction of clocks, so that a number of such may be uniform in their indications. Some time about 1840 Alexander Bain devised an electrically-driven pendulum, the principle of which was adopted by Mr. R. L. Jones, of Chester, to cause the pendulums of a group of clocks to beat in sympathy with a regulator, a system of synchronisation which met with some degree of success, but which was very limited in scope. Since that date the problem has been investigated by many with varying degrees of success.

Greenwich mean time has been for many years, and is yet, the standard time for Great Britain and Ireland, and the facilities afforded by the network of wires under the control of the Post Office authorities have been made use of for the distribution of standard time to those to whom the possession of means for ascertaining at any moment exact Greenwich mean time is a *sine qua non*. The distribution over the wires has hitherto resolved itself into the transmission from Greenwich Observatory—where the standard mean time solar clock is corrected daily about 9 a.m. to accord with the results of the preceding nocturnal stellar observations—of an electrical signal to the Central Telegraph Office in London, whence it is radiated over the telegraph wires to offices in distant towns, and thence over direct circuits to the subscribers who require the intelligence,