THE EARTHQUAKE IN EUROPE.

Nearly six months have elapsed since the Charleston earthquake. The coast line of the vicinity of the unfortunate city experienced a seismic disturbance unprecedented in intensity as regards that locality. The wave, starting from a center near the city, extended far and wide, affecting a vast region with shocks of greater

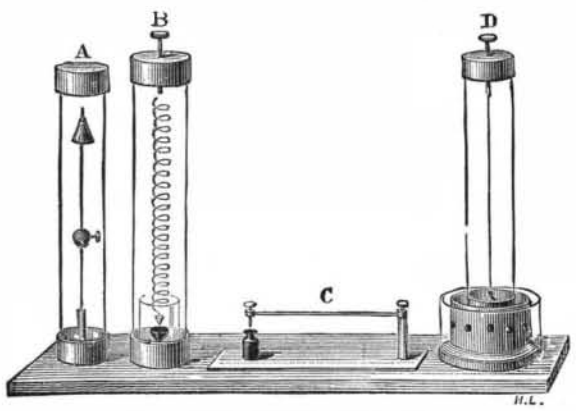


Fig. 1.—VARIOUS SEISMOGRAPHS.

or less severity and number. As we are going to press, the cable brings the news of a similar disaster that has affected the southern part of France and northern Italy. The Riviera, the great winter resort of the Continent, comprising the banks of the Ligurian Sea and the Gulf of Genoa, has been violently shaken by an earthquake that in its destruction of life, as last reported, far surpasses the Charleston one, and which will take its place among the memorable earthquakes of the world.

On February 23, the cities of the Riviera were resting after the carnival, which had terminated the night before. At twenty minutes to six on the morning of that day, a shock was felt at Geneva; next Turin, Milan, Bologna, Leghorn, Marseilles, Toulon, and the whole Rivierafelt it. It reached Cannes at 6:05, and Leghorn at 6:23. In Nice, sixty buildings were ruined and left tottering, and the tower of the church of St. Augustine was thrown down. The inhabitants left their houses, and numerous camps were established. A patrol of the military was maintained for the preservation of order. The exodus then began, six thousand people leaving the region in one day.

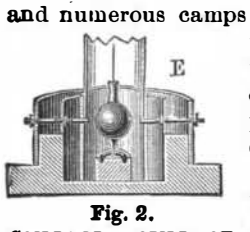


Fig. 2.
CONTACT POINT OF SEISMOGRAPH D.

The shock was felt all along the Riviera, Mentone and San Remo and the other towns being involved in the catastrophe. The Genoese region was most severely affected. Many hundred deaths are reported from the interior and coast of that district alone. In one village a loss of three hundred lives is reported. Bajardo and Diana Marino are completely destroyed. Fifteen thousand people left Nice, and twenty thousand Genoa. In Bajardo, Castellano, and Aurigo, the churches were destroyed. Shocks are reported as felt at sea at 6 A. M. and 8 A. M. off the coast. At the Vesuvius observatory no shocks were recorded. Several trains with supplies, and carrying soldiers, have been dispatched to the relief of the sufferers in the interior. The total number of deaths so far reported is between one and two thousand. The number, it is to be feared, will be rather increased than diminished by later reports.

Going inland, the shocks extended east and north as far as Parma and Turin. To the south the effects were felt on the island of Sicily, Catania, at the foot of Mount Etna, being disturbed. Damage is reported in the Basses Alpes and Department of the Var.

In Washington, D. C., which is provided with a seismoscope, set up in the physical laboratory of the United States Signal Office, a disturbance was noted at 7:33 A.M. on February 23. From this observation a calculation of the velocity of transmission of the earthquake wave will be calculated. It represents nearly 600 miles per hour.

Although the United States have felt comparatively safe from these visitations, the last year has shown that we can no longer boast of our immunity. The extinct volcanoes of the Auvergne in France, and the active volcanoes of Italy and Sicily, to a certain extent, menaced the security of the region now shaken. Yet no one anticipated such a calamity, and the future prosperity of the Riviera, so largely dependent on its winter visitors, has probably received a severe blow.

New York city has no seismograph, so no record is available for its share in the effects of the wave of transmission. This earthquake and the recent American ones will, we doubt not, lead to the establishment of one here in connection with the signal service.

To show what is done abroad in this direction, we illustrate one of the great earthquake stations of the world, and its apparatus, the Vesuvius observatory. It is erected on the side of the mountain, overlooking the beautiful Bay of Naples. The lower floor of the building contains a number of seismographs, some of the simplest construction, and others more complicated, involving registering apparatus. Several are shown in Fig. 1.

The apparatus marked A is of the simplest kind. It is a needle of steel held firmly in a vise, and its period of oscillation is adjusted by a weight that can be set at different heights. It is, though simple, extremely sensitive. B and C are intended to work electrical registering apparatus. They have contact points, that are held over mercury in cups, and kept just out of contact with it. On being vertically agitated, the points dip into the mercury, thereby closing a galvanic circuit and operating registering apparatus. B is intended for weak, and C for strong shocks. D shows an apparatus for indicating horizontal shocks. A pendulum terminating in a platinum point hangs within a glass case. The point lies within an annular trough filled with mercury, shown on a larger scale in Fig. 2 at E. The least horizontal movement causes the pendulum to swing so as to immerse the point in the mercury, closing an electric circuit and effecting the registration.

To produce the registration, an apparatus shown in Fig. 3 is used, comprising two clocks and recording

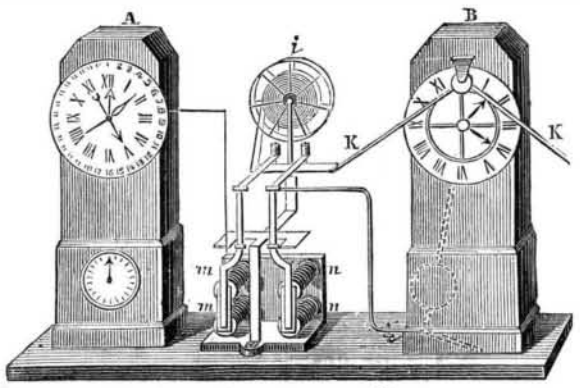


Fig. 3.—REGISTERING APPARATUS.

mechanism. The one marked A runs continuously. The clock B is held arrested, and only starts when a current due to the movements of the vertical or horizontal movement seismograph passes through either the electro-magnet *m m* or *n n*. Such a current attracts the armature of the magnet, starts the clock into motion, and rings an alarm bell, thereby causing the recording tape to be unrolled. We may assume the magnet, *m m*, to be connected with the apparatus for registering vertical movements. Its armature carries a pencil of definite color that marks the tape as long as the disturbance continues. The other magnet, *n n*, whose armature is provided with a pencil of different color, acts in the same way for horizontal shocks.

For undulatory movements, the apparatus illustrated in the next cut, Fig. 4, is used. A series of U tubes, one of which is shown on a larger scale in Fig. 5, containing mercury are held in a frame, some lying in the meridian and others across it. By contact points the least disturbance causes a current to flow to the registering apparatus. Each tube is provided with a float

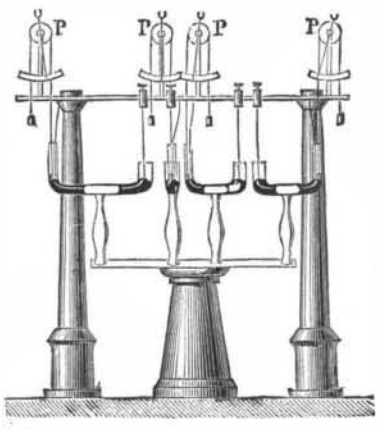


Fig. 4.—APPARATUS FOR UNDULATORY MOVEMENTS.

from which a cocoon fiber runs up and over a pulley, and carries a weight at its end. This moves an index attached to the axis of the pulley, and thus shows the extent of the wave movement.

It is with such instruments as these that the movements of earthquakes are recorded. In the interests of science, it is to be regretted that more such stations do not exist. For some days before the earthquake in Ischia in 1883, the apparatus in the Vesuvius observatory was continually excited, but owing to our imperfect knowledge no prediction was possible. The establishment of more such stations may lead to the possibility of predicting these disasters.

On the same day that brought the cable accounts of the disaster, a full account was received of the great eruption of Mauna Loa, in Hawaii. This occurred last January, and was of great interest, and was accompanied with heavy earthquakes. If the theory of earthquakes ever assumes a tangible shape, some connection between distant disturbances may be traced.*

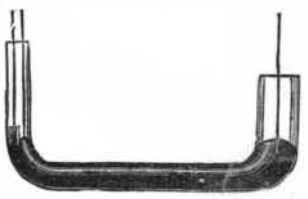
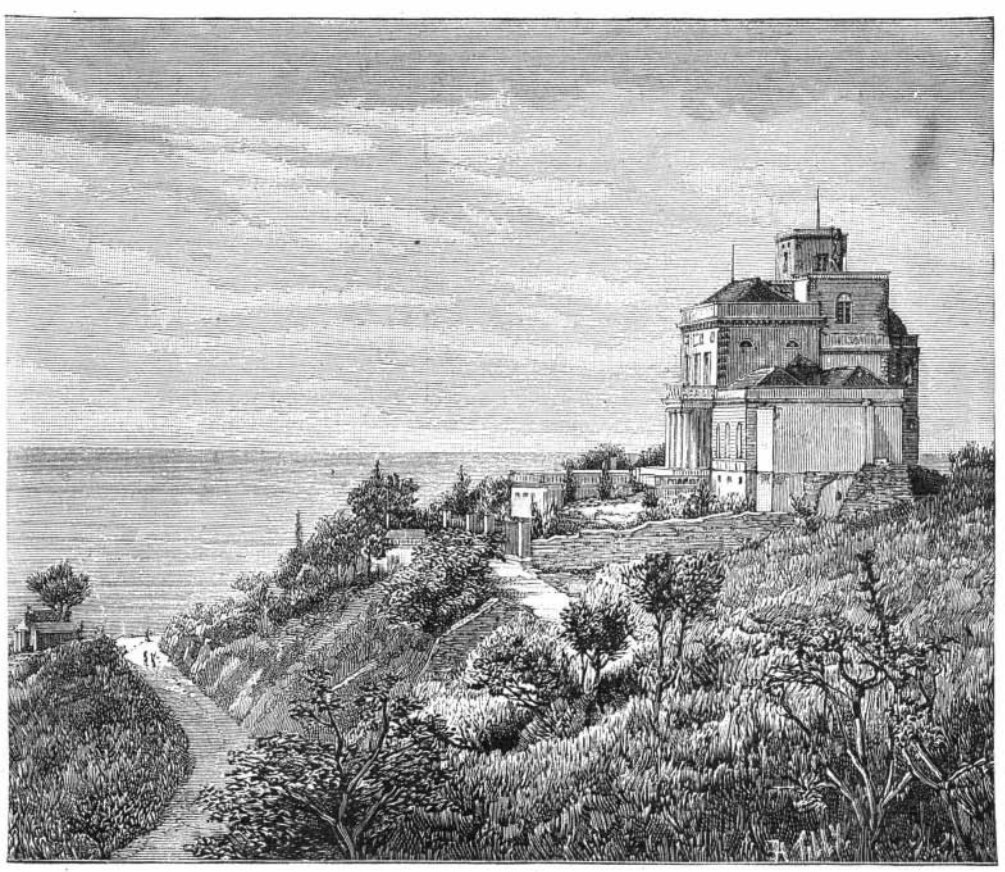


Fig. 5.—U TUBE OF UNDULATORY SEISMOGRAPH.



THE VESUVIUS OBSERVATORY.

Famous Earthquakes.

The following is a list of the principal earthquakes that have taken place since the twelfth century, with the casualties caused:

Year. Place.	Persons killed.
1137—Sicily	15,000
1158—Syria	20,000
1268—Cilicia	60,000
1456—Naples	40,000
1531—Lisbon	30,000
1626—Naples	70,000
1667—Schmaki	80,000
1692—Jamaica	3,000
1693—Sicily	100,000
1703—Aquila, Italy	5,000
1703—Yeddo, Japan	200,000
1706—The Abruzzi	15,000
1716—Algiers	20,000
1726—Palermo	6,000
1731—Pekin	100,000
1746—Lima and Callao	18,000
1754—Grand Cairo	40,000
1755—Kashan, Persia	40,000
1755—Lisbon	50,000
1759—Syria	20,000
1784—Ezinghian, Asia Minor	5,000
1797—Country between Santa Fe and Panama	40,000
1805—Naples	6,000
1822—Aleppo	20,000
1829—Murcia	6,000
1830—Canton	6,000
1842—Cape Haytien	4,000
1857—Calabria	10,000
1859—Quito	5,000
1860—Mendoza, South America	7,000
1868—Towns in Peru and Ecuador	25,000
1875—San Jose de Cucuta, Colombia	14,000
1881—Scio	4,000
1886—Charleston	96

Lubricant.

A mixture of 100 parts of mineral oil, says *Dingl. Polyt. Journal*, with 25 parts of castor oil, is well mixed with 60 to 70 parts of sulphuric acid, and then worked with 2 or 3 volumes of water. The whole is allowed to stand; the watery layer is then drawn off, and it is then allowed to stand for several days, when it is carefully neutralized with soda or potash. The product is termed "bakusin."

* For additional illustrations and descriptions of seismographs, see SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 455, 488, and 563.

Dried Sewage.

Many attempts have been made to convert sewage sludge into a marketable manurial article, with greater or less success, among other processes being that of separating the liquid from the solid constituents by filtration under pressure. The most recent system of fluid deprivation, and perhaps the most rational one, having regard to the value of the ultimate product, is that of Mr. Astrop, whose system of converting sewage sludge into dry powdered manure was inspected recently by a party of above 200 gentlemen interested in such matters, who were conveyed by special train to Walthamstow, where the works are situate. The works are situate close to the Walthamstow sewage works and farm, and consist of a timber building two stories high. On the ground floor is the driving power, consisting of a 12 horse engine and boiler; part of the desiccating apparatus is also on this floor, but the treatment of the sewage sludge commences on the upper floor. Here is a tank into which the sewage sludge is pumped after it has been chemically treated and deprived of its supernatant water by Mr. Jerram's arrangements in the adjacent sewage works. The tank will contain about 400 gallons of sludge, which is fed into the water extracting machine through a 6 inch pipe, and the supply is regulated by a sluice valve.

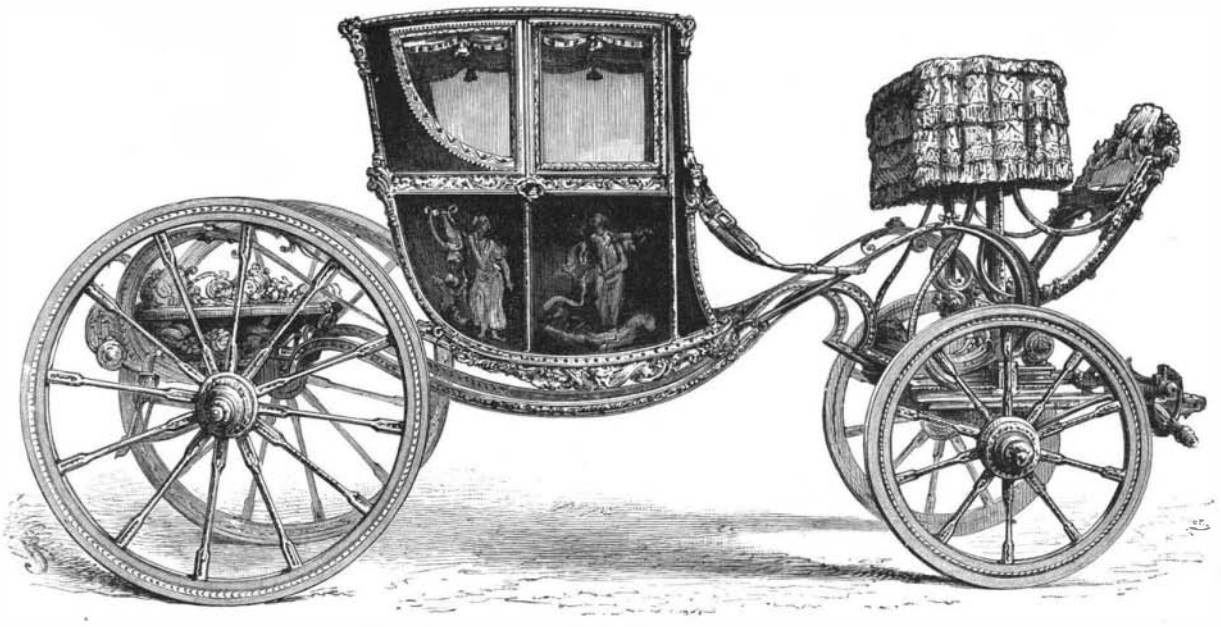
The machine, which is about 24 feet in length and 8 feet in width, consists first of a large sludge vat, in which are two hollow perforated metal cylinders, 12 inches diameter, and covered with fine wire gauze having 6,400 meshes per square inch. These cylinders revolve against brushes, which keep the meshes of the wire gauze clear. By means of a pump a partial vacuum is created in these cylinders, and the result is that about 60 per cent of the moisture contained in the sludge is extracted at this point. From this tank the sludge is delivered by a sluice valve on to an endless traveling web of wire gauze of the same mesh as that on the cylinders, the web being as wide as the machine—namely, 8 feet. This web is supported by brass rollers placed at intervals, and passes under two rollers and over two of Korting's exhausters, which remove another 10 per cent of the moisture. The sludge has now assumed the consistency of a thick paste, and in this condition it is passed between five pairs of rollers furnished with iron scrapers. From the last pair of rollers the semi dried sludge falls into a hopper, whence it is fed into a disintegrating cage on the lower floor, and in which it is finally disintegrated and dried by a blast of warm air, leaving only about 5 per cent of moisture in it. The solid particles of the sewage now assume the form of a coarse powder, which falls through the wire meshes of the disintegrator on to the head of an Archimedean screw running in a long trough, and by which means the powdered manure is delivered into a pit, whence it is packed in bags for the market. The continuity and efficiency of Mr. Astrop's system were satisfactorily demonstrated to those present, and it was stated that the resulting powder possesses a high manurial value. The process is certainly simple and effective, and if the commercial results of the use of the manure prove successful—and there appears to be no reason why they should not—the process would seem to offer a satisfactory solution of the sewage question under certain conditions.—*London Times.*

Quince Cider.

A very pleasant beverage can be produced as follows: Take a quantity of ripe quinces, cut into quarters and with the pips, etc., removed. Boil these in a copper with double their weight of water; when boiled to perfect softness, pour the must into a vat. To this add, for every fifty pints of must, two pounds of sugar and half a pound of yeast, diluted in a sufficiency of hot water. Mix the whole well together, and allow to ferment. Then strain and bottle.

SOME FINE OLD CARRIAGES.

The Cluny Museum of National Antiquities, in Paris, France, contains some fine specimens of the work of carriage makers of a period dating back at least as far as the commencement of the last century. These old carriages, some of the most noteworthy of which are represented in the accompanying illustrations, are still in a perfect state of preservation, and afford striking evidence of the skill and taste of the artisans of that early period.



ITALIAN STATE CARRIAGE, 1710-1725.

The Italian carriage here shown is styled a gala chariot, and is designated by a French artist as a *voiture a l'Anglaise.* The springs are of English manufacture, having upon them the stamp of a London maker. The panels are painted with symbolical figures of Literature, Science, and Art. The design and ornamentation are throughout pretty and graceful, but the vehicle has an amount of work put upon every detail which one will look for in vain in the carriage maker's productions of to-day.

FRENCH SEDAN CHAIR, 1700.

In the French state carriage the apparent heaviness of the frame is the most noticeable characteristic. It is almost wholly of wood, the least possible quantity of metal being used in its construction. The body rests in Berlin fashion on a double perch, between the poles of which are long leathern straps, curling over wheels with great circular plates, all notched and gilded, by which means the straps are tightened or loosened at pleasure. The panels are painted with mythological subjects on an aventurine ground. An extraordinary effect of lightness is given by the brilliant coloring of the paintings and the ribbons which adorn the unoccupied space, as well as by the complete framing of the body of the coach, with its windows and doors, in gilded foliage.

Several specimens of the Sedan chair of an early period are to be seen at the Museum, one dating from the period of Louis XV. being represented herewith. It is richly adorned on either side with landscapes on a gold ground, and in front with armorial bearings.

The amount of money lavished on the carriages of the wealthy and high born, in the sixteenth and seventeenth centuries, before carriages came into general use, was sometimes enormous. Italy was especially notorious in this line. A state coach, built in 1629, for the marriage of Eduardo Farnese with Margarita of Tuscany, kept twenty-five silversmiths at work for two years, and shone with some 2,500 ounces of silver.

This suggests the carriage which the Sultan of Turkey had built in 1860, for one of his wives, which was made as far as possible of silver, and cost $60,000. In Italy, artists of note were employed to paint the panels, Pontormo, in 1516, having painted two triumphant cars for Leo X. with mythological scenes. These earlier carriages were, however, not to be compared, as serviceable vehicles, with those built toward the end of the seventeenth century, of which our illustrations furnish some of the best examples now in existence.

FRENCH STATE CARRIAGE, 1710-1725.

Persian Rugs.

"Persian rugs are all made by hand, without a single exception. They are stretched on frames as one would make a sampler, and all the family work on them. A pattern for that particular carpet is before them, which they follow with more or less precision, according as their fancy suits them. As a rule, considerable license is allowed for the expression of individual taste in working out these patterns. No two carpets are therefore exactly alike, and the owner of an old Persian rug may be reasonably sure that while he may find other rugs resembling his, not one that is absolutely identical exists. This quality gives them a value similar to that possessed by an oil painting."

The Persian Government has interdicted the use of aniline dyes, which threatened at one time to ruin the soft harmonious tints of the product of the Persian loom. The rugs of Turkestan (mistakenly called Bokhara rugs) are dyed with aniline frequently, since Turkestan is now under Russian instead of Persian control; and the introduction of machine methods and exact reproductions into Sultanabad in Turkestan, which has recently taken place, may prove a death blow to this peculiar industrial art. There is one kind of rug made in Persia which never leaves that country, on account of its great weight and bulk and consequent cost of transportation. This is a kind of carpet felt, called namads. The ground is made first, the design being beaten in with mallets on one surface only. Another rug which rarely reaches Europe is the "ghilleem," made wholly or partly of cotton. The rich colors are imperishable, and the rug can be washed like a piece of calico. The so-called silk rugs are used almost entirely for hangings. They are rare, and of course very costly. One lies before the peacock throne of the Shah.