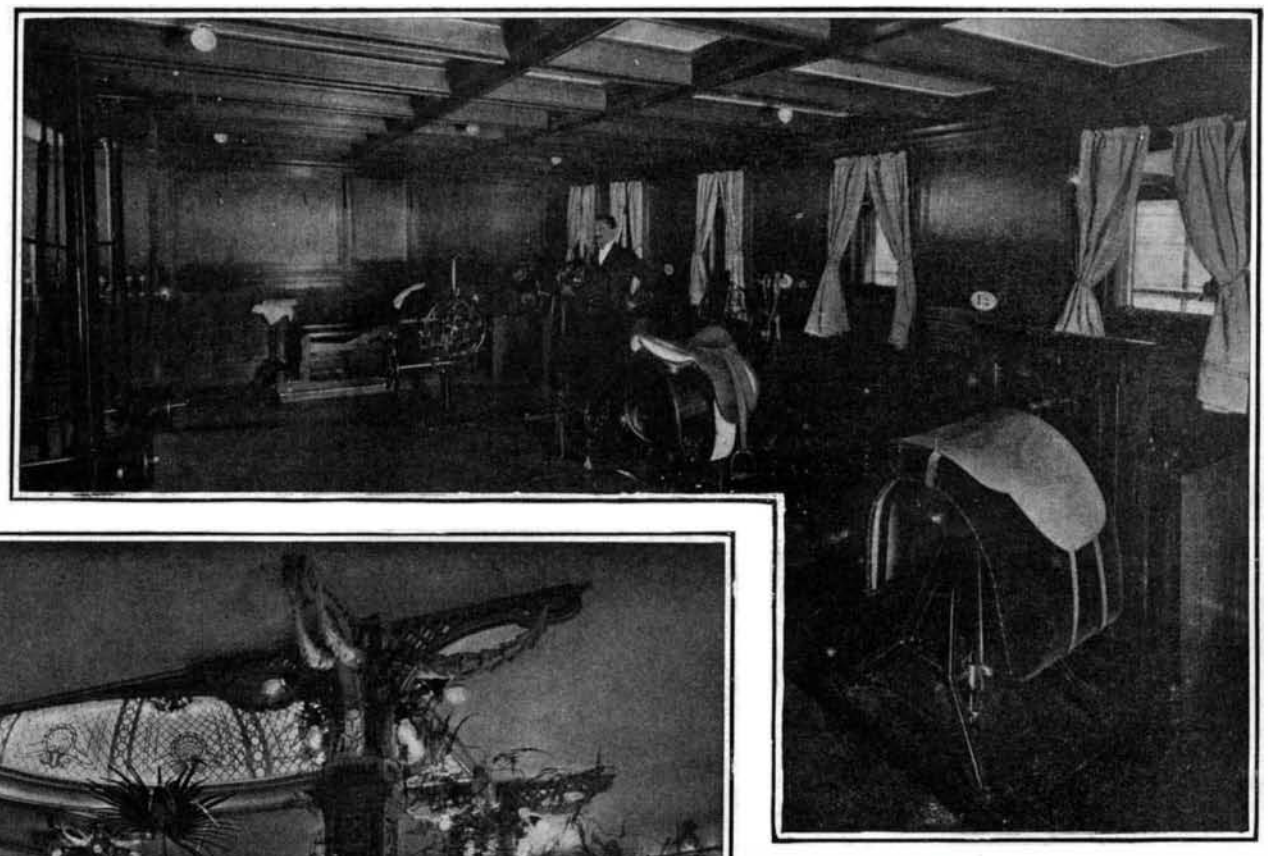
THE LATEST AND LARGEST STEAMSHIP.

In spite of the huge size to which the transatlantic steamer has grown, the dimensions of the latest of the new liners to visit this port exceeds them all. The "Kaiserin Auguste Victoria," of the Hamburg-American line, which has just completed her maiden voyage to New York, is to-day the largest vessel afloat. She belongs to that class of passenger ships of moderate speed in which the space that in a faster vessel would be given up to boilers and engines is reserved for cargo. Because of the higher revenue-earning ability thus secured, the passengers can be carried at lower rates than those which must be charged on such fast ships as the "Deutschland."

The "Kaiserin Auguste Victoria's" main dimensions are as follows: Length over all, 700 feet; beam, 77 feet; height from keel to boat deck, 87 feet; height from water line to boat deck, 55 feet. From the keel to the top of the masts is 187 feet; the smokestacks measure 13 by 16 feet in diameter, being oval in section. The ship has a cargo capacity of 16,000 tons, and a gross registered tonnage of 25,500 tons. It is estimated that when the engines have been running for a few months, she will maintain a sea speed of 17½ knots an hour. The coal bunkers have a capacity of about 3,500 tons.



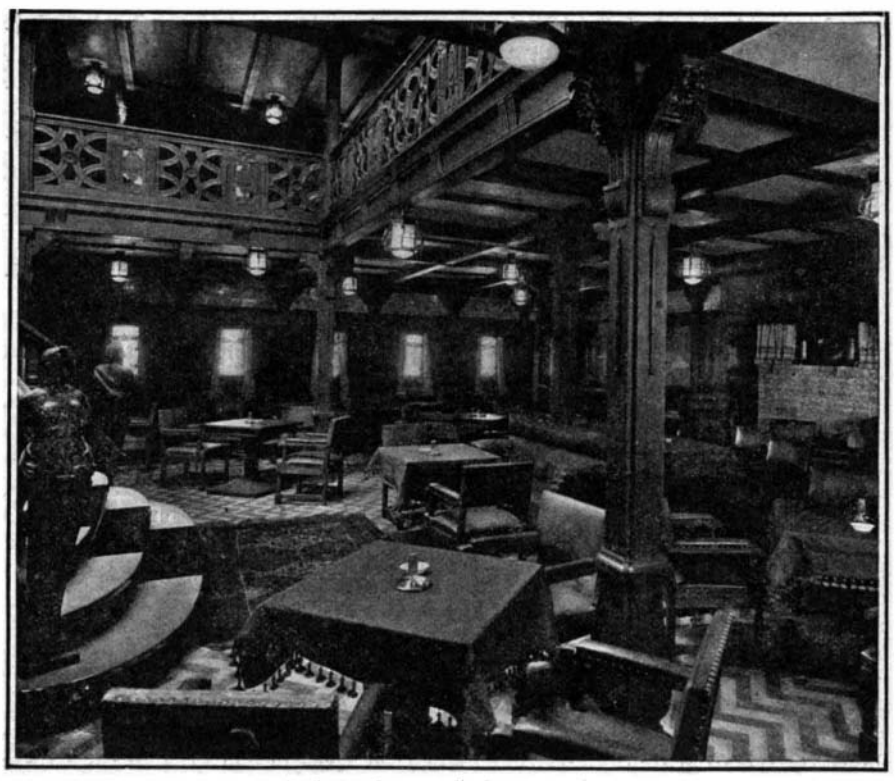
The Gymnasium.

View in the Palm Room.

The ship is driven by two four-bladed manganese-bronze screws, 22 feet in diameter. The propeller shafts are 19.3 inches in diameter, and 217 feet in length. The motive power consists of twin, quadruple-expansion four-cylinder engines of 17,200 horse-power. Steam is supplied by eight double-ended and one single-ended cylindrical boiler. Forced draft is used and the steam pressure is 220 pounds to the square inch.

The accommodations on the "Victoria" are planned on the same generous lines as those of the somewhat smaller sister ship "Amerika." A new feature, however, is the addition of one more deck, making no less than nine separate decks. The "Victoria" is therefore literally a marine skyscraper. Up to the main deck the vessel is divided by twelve transverse bulkheads. The compartments that lie below the main deck have each separate companionways, so that at night and during stormy weather the bulkhead doors can be kept closed. Above the main deck are four other decks, of which three can be used for promenading, the total area being 30,000 square feet. The promenades are from 12 to 15 feet broad and the height between decks is from 8 to 10 feet.

This huge ship is capable of accommodating, including steerage passengers, as many as 3,500 souls. In the first cabin there are 601 berths, in the second cabin 286, and in the third cabin 216 berths, making a total cabin accommodation of 1,103 passengers. The complement of the ship totals up 588 men, of whom 141 constitute the engine-room force, and 360 the kitchen and service personnel. The vessel has the usual luxurious suites of apartments, the decoration of which has been carried out with consummate taste, the colors being subdued and the furniture in simple and tasteful styles. There are the usual ladies' rooms, music room, library, and a magnificent two-storied smoking room, with a broad sweeping stairway connecting the two floors. The furnishing of this room is in oak in natural color, and it is richly adorned with paintings by well-known artists. In addition to the main dining saloon,

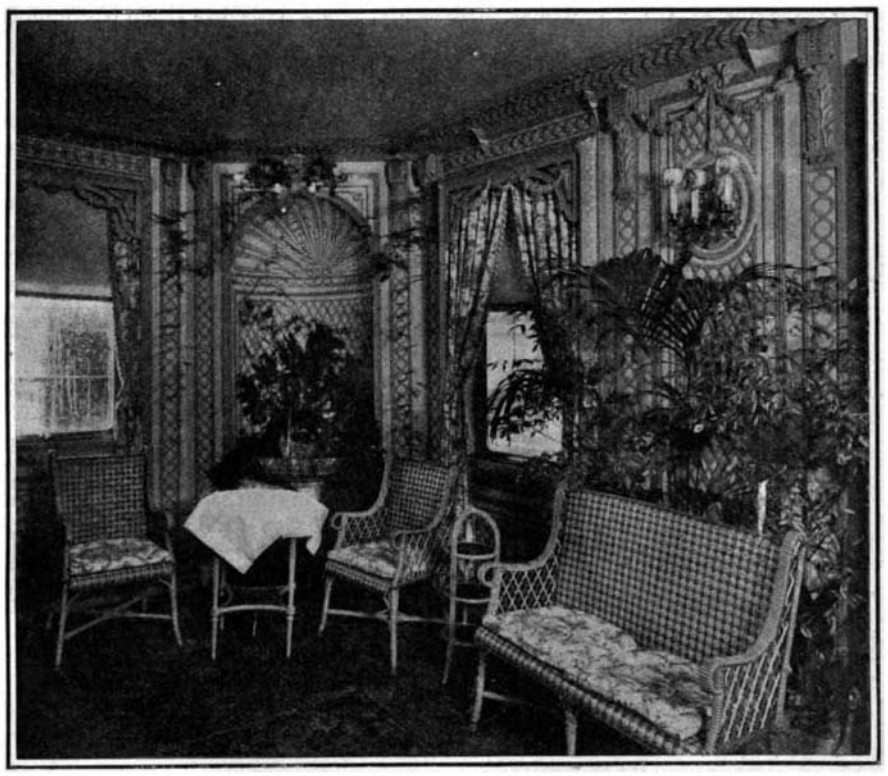


Upper Floor of the Smoking Room.

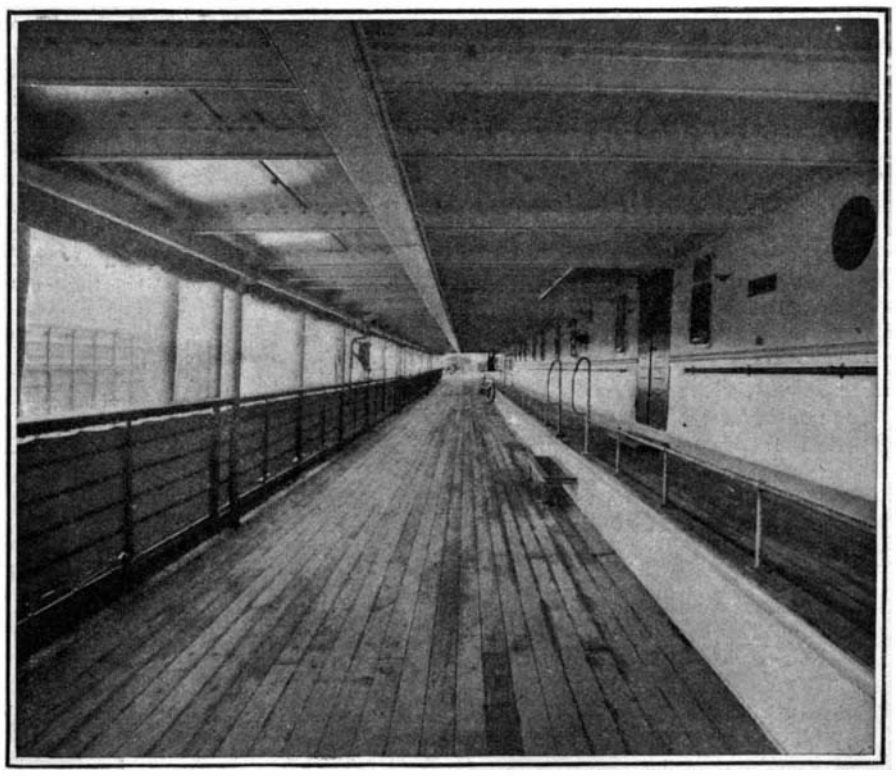
The Main Stairway.

there is a restaurant, where meals are served *a la carte* at any hour of the day. An excellent feature, which is characteristic also of many of the later German ships, is a gymnasium, which is stocked with apparatus on which one may reproduce the motions and general exercise of horseback riding, bicycling, etc.

As showing how completely the modern steamship has been brought up to the level of comfort of the first-class hotel, it may be mentioned that there is on board a florist's shop where fresh flowers can be procured at any time during the voyage, while at the after end of the Kaiser deck is another feature that is entirely new on transatlantic steamships, namely, a palm garden. As will be seen from our illustrations, this is a most dainty room, beautifully decorated with palms, plants, and flowers. The whole front is provided with windows of the size approximately, of those found in a city house; while the room is further lighted by a glass cupola in the center of the ceiling, which is carried on delicately carved pillars. The walls and skylight are beautified with a

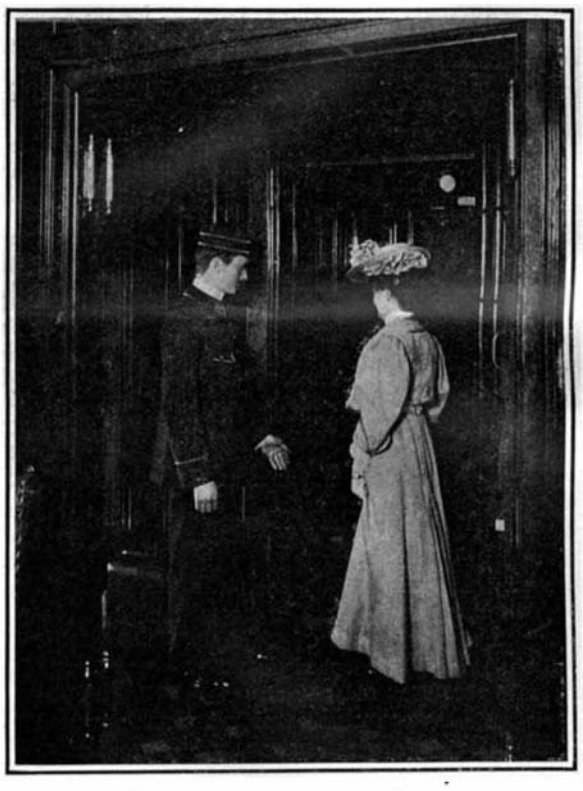


Corner of Palm Room, Showing Fountain and the Large Size of Windows.



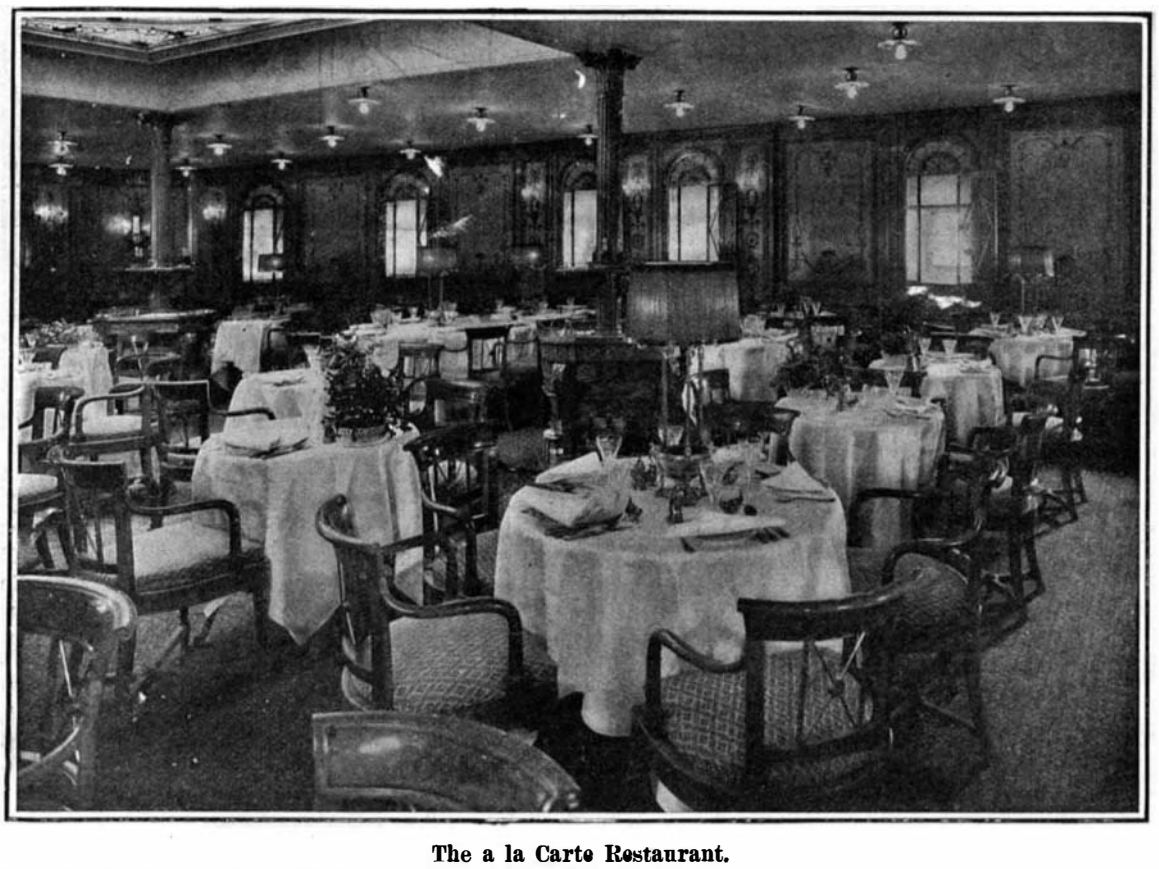
Novel Deck; Raised Promenade Section at Rear of Space for Steamer Chairs.

The Music Room.



An Entrance to the Elevator.

Stairway from Lower to Upper Floor of Smoking Room.



The a la Carte Restaurant.

THE LATEST AND LARGEST STEAMSHIP.

flower-covered trellis, while in opposite corners are two grottoes modeled after those of Versailles. When seated in this really dainty room, and listening to the splash of water in the fountains, it is difficult to realize that the scene is laid upon the deck of a ship, and not in some city hotel or private conservatory. Like her predecessor, the "Kaiserin Auguste Victoria" is provided with a passenger elevator, this being the second time that this modern invention has been installed on an ocean passenger steamer. A feature in the ship which will be highly appreciated is the great width of the passenger promenade decks, and the fact that on some of these decks there is a separate promenade, slightly elevated above the general level of the deck, along which passengers can walk without interfering with the view or inconveniencing those who are reclining in chairs.

EUROPEAN EARTHQUAKE RECORDERS.

BY THE PARIS CORRESPONDENT OF THE SCIENTIFIC AMERICAN.

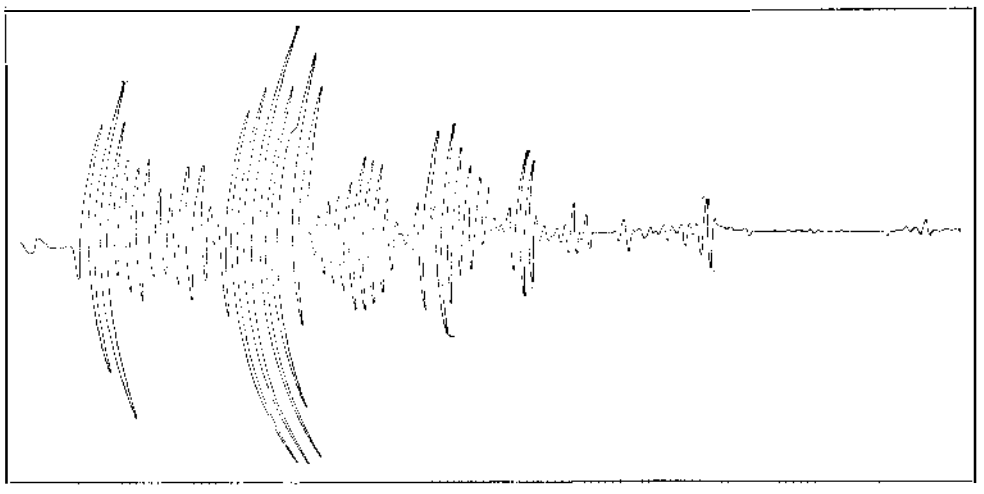
In order to show the present advances which have beeen made in recording earthquake disturbances in the different observatories of Europe, we illustrate some of the most recent work of Prof. Milne, the Director of the Shide Seismographic Observatory established in the Isle of Wight, also some of the instruments and researches of two of the leading Italian observatories.

Prof. Milne is at the head of an important project which is to systematize the records of earthquakes and so establish a base of scientific calculation and comparison of the results, by which it is hoped to find some general formulæ and conclusions of value in this regard. Owing to the great authority of Prof. Milne, the following information with which he has had the courtesy to supply the writer will be of interest. As it has been established that the movements resulting from a large earthquake originating in any one portion of the globe can with the aid of suitable instruments be recorded in any other portion of the same, the Seismological Committee of the British Association have asked for the co-operation of observers in various parts of the world so as to extend and systematize the observations of this nature. The first object in view is to determine the velocities with which this motion is propagated around, and possibly through the earth. To reach this result, all that is required at a given station is to have the times at which the phases of the motion are recorded. An instrument which takes the horizontal component of the movement is enough for this, at least to begin with. We may also secure other information in this way which will be of value. Thus we may be able to determine the force of submarine disturbances, such for instance as have interfered with telegraph cables, and thus new light will be thrown upon changes taking place in the ocean bed. The records also throw light upon certain classes of disturbances which are now and then noted in magnetometers and other instruments susceptible to slight movements. Local changes of level, some of which have a diurnal character, may also become apparent.

The committee have selected a type of instrument devised by Prof. Milne as being the best adapted for attaining the object in view, and at present a number of the leading observatories in different parts of the world have been equipped with this apparatus so as to co-operate in obtaining the results we mention. The instrument consists of an iron bed-plate and stand (as shown in the diagram) carried on three leveling screws. Resting against the needle-point or pivot projecting from the lower part of the stand, and held in a nearly horizontal position by a tie, is a light aluminium boom. Attached to the outer end of this boom there is a small rectangular plate in which there is a slit. The boom is properly pivoted and balanced, so as to form a horizontal pendulum. When the boom swings to the right or left, the plate with its slit passes to and fro across a fixed slit in the lid of the box, inside which a 2-inch strip of bromide paper is driven by clockwork. Light from a lamp is reflected downward by a mirror to cover the whole of the latter slit, but it only enters the box to the right and left of the moving plate and through the slit in the same. When the boom is steady, the result upon developing the band of bromide paper will be a white band equal in width to that of the moving plate, down the center of which is a clearly-defined line. To the right and left of the white band the paper is blackened by the light. The time intervals are shown on the bromide paper band by means of a watch movement whose minute hand, broadened out for the purpose, moves over the paper for about one minute and cuts off the light. This occurs at the half-hour point. In order that the photographic paper may be examined or removed at any time, the windows of the room should be provided with shutters, through one of which red light may be admitted.

The instrument is placed so that the boom is in the meridian, or pointing north-south. It is given a certain sensibility, which increases as the period of its swing increases. To this end it is adjusted for a pendulum swing of 15 seconds, counting a double swing. The clock-box is run on rails in and out of the instrument, and has a cover which is removed to wind the clock and replace the paper on the roll. Generally a 35-foot roll of bromide paper is used, wound upon a cardboard cylinder, so as to be easily put into place. If desired, the watch movement for recording the time can be replaced by an electric device. The marks can be made by an electro-magnet connected with a regulator clock giving contacts of 15 or 20 seconds interval. The paper strip is developed once a week in general.

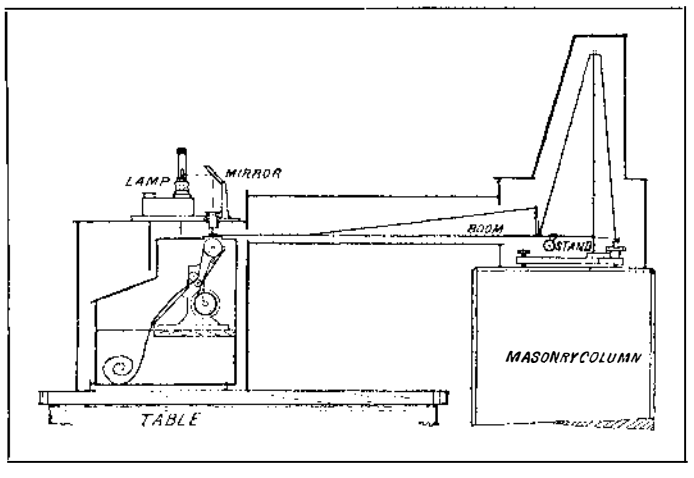
The information required for a seismogram is the date on which it was obtained, the Greenwich mean



Record of the San Francisco Earthquake Made by the Stiattesi Recorder at the Quarto Observatory.

times for the commencement of a decided motion and of a maximum motion. By taking the time between the first preliminary tremors and the first maximum, we may infer the distance of the origin of the shock from the observing station.

Prof. Milne states that this type of instrument has now been installed in no less than forty-five different observatories, which are engaged in co-operating in this work, and it is hoped that some important data will be secured, so as to throw some light upon the many obscure points relating to earthquakes and volcanic action. Besides the leading countries of Europe, we find the apparatus set up at observatories in Ceylon, Egypt, Honolulu, India, Java, Japan, New Zealand,



Section Through Milne's Photographic Recorder.

Canada, South America, Syria, and others. In the United States it has been installed at Swarthmore College, Philadelphia, and at the Johns Hopkins University of Baltimore.

Besides the apparatus which we have just described for obtaining a photographic record, the Shide Observatory is also equipped with a type of mechanical recorder devised by Prof. Milne. It also works on the horizontal pendulum principle, but in this case the diagram is traced in the usual way by a needle point upon a revolving drum, and the glass needle traces the vibrations upon a surface of smoked paper. This instrument is shown in the accompanying photograph, and it is of interest to observe that it traced the record of the San Francisco earthquake. The vibrations were recorded 15 minutes after the disturbance commenced at San Francisco, and again at 40 minutes after the earthquake. It is inferred that in the first case the vibrations were transmitted directly through the earth, while the later ones traveled around the circumference.

In this connection we also give some of the results which have been obtained by the well-known Italian authority, Director Rafaello Stiattesi of the Geodynamic Observatory, which is located not far from Florence, and is well equipped with the most improved forms of seismographic apparatus. With his latest form of seismograph he succeeded in securing a very clear record of the San Francisco earthquake. It was secured by the new Stiattesi horizontal pendulum apparatus having a mass of unusually heavy weight, this being no less than 1,100 pounds. He uses a lever arm which magnifies the vibrations 50 times, and they are recorded on a wide moving strip of smoked paper which is unrolled before the needle by clockwork at the rate of 70 inches per hour. With this apparatus he recorded the first tremors of the earthquake and at some time afterward, the principal movement. Here the instrument gave a swing of no less than 18 inches, or 9 inches on each side of the center. Director Stiattesi, owing to the great clearness of the records and his long experience in this science of which he is one of the chiefs, has made an advance in the question of earth disturbances, having established a formula for calculating the distance of the disturbance point by means of the diagrams. To show how close his formula works, he states that his calculations from the diagrams gave the distance from the observatory to San Francisco, which is 6,158 miles, to within 2 miles. His new instrument, which is shown here, consists of an iron bracket suspended on pivots from the wall and carrying a heavy weight on the outer arm. The arm carries a light pointer, which works against the short arm of a light aluminium lever, and the latter traces the record on a cylinder or a roll of smoked paper.

One of the most important centers of seismological work in Italy is the Ximeniano Observatory, also near Florence, which has been brought to the first rank by the researches of Director Guido Alfani. We give a view of the new recording instruments which have been designed by this eminent scientist. They follow the same general lines as those which we have just described, but contain many improvements in detail. One of the views shows a double instrument consisting of two horizontal pendulums carrying very heavy weights. Both needles trace the records on the same sheet of smoked paper, and the two pendulums are placed at right angles to each other.

The success of these instruments depends upon the method of suspension and the pivots of the pendulum arm, and especially upon the mechanical movement of the light recording lever. In the Stiattesi and the Alfani instruments are found many ingenious details which required a long study, but we cannot at present describe these fully, except to mention a great improvement which consists in connecting the pendulum arm with the short arm of the recording lever by means of a magnet joint, where the magnetism of a small iron rod holds the two pieces together and at the same time allows a free play between them.

These two Italian observatories have secured some very fine records of the Calabria earthquake, also those of Russia, Formosa, India, and others, from which it is hoped to make calculations which will add greatly to our knowledge of these phenomena.

Is There a Cure for Color-Blindness?

The question came up recently, according to the Central Zeitung für Optik und Mechanik, if the use of rosalin colored glasses sometimes recommended was a certain cure for, or help in, the case of that class of color-blindness in which red and green cannot be distinguished from one another. This question is answered in the periodical named, by Herr Pichon, of Cologne, in the negative, but with some reservations.

Color-blindness is inborn; and it is impossible by means of glasses of any special color or kind to implant in a color-blind person that sensitiveness to color with which Nature has not endowed him. The fault lies with certain fibers in the retina. There is, however, a means by which even the perfectly color-blind can be enabled to recognize and distinguish every color, and even every shade of every color—without, however, being able to distinguish the colors as can the normal eye. This help is based on that principle of any colored glass, by which it permits most easily the passage of those rays which correspond to its own color; and tends to arrest all rays of the complementary color. Those who are color-blind to red and green cannot normally distinguish between these colors, both of which appear to them