ON THE OCCASION of introducing his course of lectures at the Sorbonne, M. Ribot reviewed the history and aims of psychology. England, Germany, France, Italy, and the United States, by instituting collegiate and university chairs in this department, and by publishing journals, books, and researches devoted to it, all show an increasing activity in this direction. According to M. Ribot, a psychologist is a naturalist: his subject is a part of biology, and is to be treated by precisely as scientific and as exact methods. It is not a metaphysics in any sense, and is no more called upon to speculate on the nature of the soul than physics to lead us into the essence of matter. It is not a psychology with any religious, moral, or any other tendency, but is a science founded on objective facts, true for all men alike. There are no systems of psychology: there is one psychology, as there is one chemistry.

This psychology, however, was possible only after physiology had been brought to a high state of culture. The physiology of the nervous system, and especially of the brain, is the necessary basis for a scientific study of mind. Psychology also borrows from pathology, because nature prepares experiments which no man would venture to perform. It owes a debt to anthropology, to the social sciences, to culture and history. It takes a broad point of view, having already adopted the methods suggested by comparative biology and the evolutionary movement. The field is already so broad that specialists are necessary, although the whole development is not fifty years old. M. Ribot has given expression to a conviction which is now everywhere current, and which seems destined to play an important *rôle* in the science of the future, in this country as well as elsewhere.

GENERAL ABBOTT'S REPORT ON THE FLOOD ROCK EXPLOSION.

THE advance sheets of General Abbott's report to the chief of engineers on the 'Earth-wave at the destruction of Flood Rock' have been kindly sent to *Science*, and form the basis of the following account:—

As to the destruction of the rock itself, 48,537 pounds of dynamite No. 1, and 240,399 pounds of rackarock, equivalent in all to about one hundred and fifty tons of dynamite, were stowed away in the galleries within the rock, and simply a touch on a telegraphic key by little Miss Mary Newton set the whole mass into instant explosion. Photographs taken by three cameras, all exposed before the mass of water lifted by the blast had reached its greatest height, indicate that all parts of the mine were fired at practically the same instant; and, by means of electric recording apparatus, this instant was recorded to be $11^h\ 13^m\ 50^s.2$, eastern standard time. It should have been at eleven o'clock precisely, and readers of *Science* are aware already that observations of the earth-wave were lost at several stations by this delay of nearly fourteen minutes. Concerning this, General Abbott says that if these volunteer observers who have criticised the delay in an unfriendly spirit had known how seriously it endangered the success of the official work intrusted to him, they would doubtless have taken a more charitable view of the matter. It was without question unavoidable, and is much regretted; but, if a similar opportunity ever occur again to make earth-wave experiments on so large a scale, it will be well, on the one hand, for those in charge to give official notice of possible delay when the appointed time is announced, and, on the other, for the detached observers to watch their instruments steadily until a message is sent them that the shock is over.

One of the photographs caught the first sight of the earthquake produced by the explosion. The cameras were eleven hundred and thirty feet from the rock, and the first exposure was made about two-tenths of a second after closing the mine circuit. The view shows that the camera was then still steady; the disturbance had not quite reached it, but was only about one hundred and seventy-five feet away. The second picture was taken four-tenths of a second later, and by this time the more violent portion of the wave had passed. To measure the velocity of progression over greater distances, members of the engineer corps and other officers of the army were stationed at four points on Long Island and at West Point; and, besides the successful observations from these places, General Abbott gives records from Goat Island (the torpedo station at Newport, R. I.), Hamilton and Harvard colleges; and to these we may add Princeton. Accounts of the observations made at the latter two points have already been given in *Science*. At all these stations the observers watched a surface of mercury in which the reflection of some small, well-defined object could be seen. The arrival of the disturbance shook the mercury, and caused the reflected images to disappear. The reports generally agree that the maximum of disturbance was very quickly or immediately reached, and none of them express serious doubt of the accuracy of their determi-

nations. The following table exhibits the results:—

STATION.	Distance in miles.	Interval of transmission.	Velocity in miles per second.
Willet's Point, L.I.....	8.33	8.5	0.98
Pearsalls, "	16.78	6 6	2.54
Bay Shore, "	36.65	13.0	2.82
Patchogue, "	48.52	15.4	3.15
Goat Island. R.I.....	144.89	58.8	2.46
Harvard obs'y, Mass..	182.68	219.8	0.83
West Point, N.Y.....	42.34	13.6 10.9 10.9	3.11 3.88 3.88
Hamilton coll., N.Y....	174 37	45.0 45.2	3 88 3.86
Princeton, N. J.....	48+	51	0.94

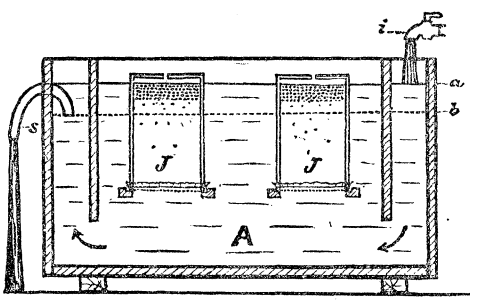
These wave velocities are any thing but accordant, and no satisfactory reason can be given for their variation; but they all agree in showing velocities that are higher than those deduced from observations on natural earthquakes; and from this General Abbott feels confirmed, in his deductions from the explosions of certain torpedoes and at Hallett's Point in 1876, that the more violent the initial shock, the higher is the velocity of transmission. At Flood Rock the charge was about six times as great as at Hallett's Point, and the velocity was from two to three times as great, over essentially the same route. Beyond this, the generalizations are not satisfactory. It is true that the velocities through Long Island, which is largely built of unconsolidated drift, are, on the whole, less than the accordant series up the Hudson valley, through rock; and the Goat Island and Harvard velocities, which must have been almost entirely through rock, seem to show a falling-off in the transmission as the wave weakened over increasing distance. But Hamilton is almost as far as Harvard, and yet its velocity is as great as at West Point; and Princeton must have felt a rock-wave at a moderate distance, and still its velocity had about the rate of that at Willet's Point and Harvard, which are very dissimilarly situated. It certainly cannot be thought that the initial velocity was slower than that at any later moment, except in so far as the nature of material traversed would affect it: therefore the apparent increase along Long Island should be looked for in the less percentage of distance traversed through the drift in reaching the further stations. But beyond this suggestion, hypothesis wanders too freely; and, unless the stations yet to be heard from solve the question, the explosion at Flood Rock has hardly taught us more than that earth-waves are very complicated, and that there is yet much to learn about them.

SUCCESS IN HATCHING THE EGGS OF THE COD.

FOR four seasons experiments have been carried on for the purpose of discovering a practical method of hatching out the eggs of the cod, — one of the most fertile and valuable of the food-fishes found off our coast. During the period mentioned no less than forty forms of apparatus have been devised and operated, with varying success, by different persons connected with the work of the U. S. fish commission. Up to the present time no device has fulfilled the required conditions, even approximately, with such success as the apparatus just devised by H. C. Chester, superintendent of the Wood's Holl station, of the commission.

This apparatus is essentially automatic, and needs so little attention that one man will by its aid readily care for a hundred million eggs. It consists of a trough seven feet six inches in length, two feet in width, and two feet four inches in depth. At about one foot from either end, vertical wooden partitions, extending to within four inches of the bottom of the trough, are secured. This leaves a space about five feet six inches in length between the partitions. In this space six or eight large glass jars are supported upon a frame, with their tops downward. Those used for the purpose at Wood's Holl are ordinary cylindrical, four-gallon specimen jars, with a half-inch hole drilled in the centre of the bottom. The stoppers of the jars are removed, and a single thickness of coarse cheese-cloth is secured over the mouth with strong twine. The jar is then inverted, and lowered into the trough, so that its bottom is about even with the top of the trough. Strips nailed across the top of the trough serve to keep the jars upright.

The accompanying figure, showing the device in



longitudinal vertical section, modified and designed on a somewhat smaller scale than the device now in use, and accommodating only four jars (two in a row), will enable the reader to get a clear conception of the way in which the apparatus is used. The trough *A* is filled with unfiltered sea-water