and Pyramid Mountains." It is unfortunate that the exact locality of the collection is not given:—

Gryphœa dilatata var. *tucumcari*, Marcou.
Ostrea marshii, as determined by Marcou.
Gryphœa pitcheri, Morton,
Exogyra texana, Roemer.
Ostrea quadriplicata, Shumard.
Trigonia emoryii, Conrad.
Cardium hillanum, Sow.
Cytherea leonensis, Conrad.
Turritella seriatim granulata, Roemer.
Pinna, Sp.
Ammonites.
Pecten.

Finally, the writer wishes to state that he is not prepared, nor does he desire, to write a final treatise on the Tucumcari, which can never be properly related until the atlas-sheets of the United States Geological Survey are completed for the region. Tucumcari is but a single station in the vast group of phenomena belonging to the deposition and degradation of the Las Vegas and Llano Estacado Plateaus and the Canadian Valley, and to be properly understood, it would be necessary to write a treatise on the whole region. One thing is settled beyond all doubt in my mind, however, and that is that the *G. dilatata* beds of the region do not belong to the Jurassic, but are undoubtedly of Cretaceous age. On the other hand, it may also be safely assumed that the *Gryphœa dilatata*, Sow., of Marcou, is not the same as *G. pitcheri*, Morton, as has been asserted by many authors, nor does it occur in the Cretaceous beds of central Texas, so far as the writer is aware. But this is a question which cannot be discussed intelligibly until a thorough revision of the Gryphæas is made.

In conclusion, permit me to say that there is not one trace of the Jurassic formation over the Texas region, as Mr. Marcou so positively affirms, and, furthermore, that there is no evidence that it was ever there, the whole trend of the testimony being to show that that region was land during the Jurassic period.

If the writer should devote his time to criticising the works of his contemporaries or predecessors, he would have little time for research. It has been my practice, however, under the opinion that all knowledge is progressive, to see the good in the works of others, and to correct any errors without abuse. In all I have published on the Texas region, there is not a line which was written with the desire to discredit any man, and yet I believe that my severest critics will confess that there has been great advance in opinion since I undertook the renaissance of geologic study in Texas.

My collections from Tucumcari are in Washington, and are open to the inspection of anyone interested. ROBT. T. HILL.

Chloropia.

THE case of Wallian, reported on page 360 of the latest volume of *Science*, would seem to be one of temporary *Chloropia*. More extended and carefully recorded observations, while the observer is looking at various objects under various conditions, would be very desirable. E. W. SCRIPTURE.

Yale University, New Haven.

Trees as a Factor in Climate.

I ONCE observed a signal case of the effect of trees in determining rainfall. A few years ago I was walking along a road in the so-called backbone of England at an elevation of from 800 to 1,000 feet above the sea-level. It was a dull, calm October day, and the hills on either side were cased in mist. Where I was no rain was falling and the ground was quite dry. As I passed on the road entered and traversed a wood of fir trees. Here I at once encountered a gentle drizzle. Far from suspecting that the trees were playing any part in the matter, I concluded that the expected wet weather had at last set in. When the road emerged from the wood at its opposite extremity I found that no rain was there falling or had fallen. Still I did not connect the trees with the downfall, but imagined that the weather had again improved.

On returning from my destination about three hours afterwards I found that the rain was still falling in the wood, but that it ceased as soon as I emerged into the open country. The ground, too, within the wood was wet, still all around it was dry. Hence it appeared that a slight rain must have been falling for the greater part of the day within the wood, but not in the bare fields and heath land outside.

Thus under certain conditions of the weather the presence of trees may determine rainfall which would not take place in their absence. J. W. SLATER.

London, England.

Mineral Wax.

I notice an account and inquiry in *Science* of June 16 in regard to the receipt at the National Museum of specimens of natural wax coming from Portland, Oregon, derived from the shores of the Columbia River, and from other accounts it is found along the coast from the Columbia River to Puget's Sound.

The material has been well known for the past half century as mineral wax, native paraffin, ozokerite and lastly as ozocerite, a hydro-carbon compound (hydrogen, 15 per cent; carbon, 85 per cent — variable); supposed to be derived from bituminous and lignite coal formation by infiltration and crystallization. It is generally found *in situ* in the neighborhood of coal and lignite beds and in the bituminous clays or shales.

The legend as to its being derived from a wreck is a most absurd one. It is a resinous wax in consistency and translucency, with structure sometimes foliated; color brown or yellowish-brown by transmitted light; leek green by reflected light; odor, aromatic, in specimens that I have examined, having the characteristics and feel of beeswax that had been lying for some time in water.

It is mined in variable quantities in Germany, Austria, Turkey, and England, associated with the soft coal and lignite beds.

In Galicia alone about 30,000 tons have been mined since its discovery there in 1859. It is used in Europe principally in the manufacture of candles and by refining in place of beeswax and paraffin. It is said to be an excellent electrical insulator.

In the United States it is mined *in situ* at Soldiers Summit, Uintah County, and in Emery County, Utah. Sixty-five thousand pounds were marketed in 1888, with a yearly increasing output. The whole product of the United States in 1890, including the Oregon find, reached 350,000 pounds.

The imports of mineral wax, ozocerite, under the names of bay or myrtle, Brazilian and Chinese wax, in 1890 were over one and a half million pounds.

It has been found *in situ* in thin seams in the lignite beds of Oregon, Washington, and British Columbia. The deposits along the Columbia River and on the sea-shore of Oregon are no doubt the debris from lignite beds near by. C. D. HISCOX.

361 Broadway, New York.

BOOK-REVIEWS.

The Seismological Journal of Japan. Edited by JOHN MILNE, F.R.S.

IN 1880 the Seismological Society of Japan was founded by a number of earnest students of seismology in that country, prominent amongst whom was the editor of this Journal. In the earlier years of its existence its membership included such well-known names as Milne, Gray, Ewing, Mendenhall and others at that time resident in Japan, and their interest in the science led especially to the invention of many instrumental appliances for the study of earthquake phenomena, some of which have been copied wherever earthquakes are observed, and in some respects have revolutionized the science of experimental seismology. It also resulted in the establishment of a chair of seismology in the Imperial University of Japan, and the organization of a bureau controlling a central observatory and some 700 outside stations. Of late years, however, the interest in the society has declined, partly through the return of some of its most active supporters to England and America, and, after publishing sixteen volumes of Transactions, in 1892 the society ceased to exist. Professor Milne, however, still remains in Japan and has determined to continue the publication of seismological literature in the present

journal, which is therefore to be regarded, not as an entirely new venture, but as a continuation of the series heretofore known as the Transactions of the Seismological Society. The new journal is issued in the same form and from the same printers as the old Transactions, and the first number, now at hand, bears on its title page Vol. XVII, which is its number in the old series, so that the new volumes can be bound uniformly with those previously issued. The annual subscription is five dollars.

In this number the first article is on ' The Mitigation of Earthquake Effects and Certain Experiments in Earth Physics" by Professor Milne, in which various lines of experiment are proposed that might possibly lead to the prediction of severe earthquakes so as to guard against their effects. In the second, "On the Application of Photography to Seismology and Volcanic Phenomena," Professor W. K. Burton describes with illustrations the photographic records from Milne's t emor indicators. In the third Professor Milne gives an abstract of the "Seismometrical Observations for the Year 1890," from which it appears that in that year 845 earthquakes were felt in Japan, of which 49 were classed as severe, 264 as moderate and 532 as feeble. Of the severe earthquakes, four (Jan. 7, Mar. 19, Apr. 16, Nov. 17) were accorded more detailed description. In the fourth article "On the Overturning and Fracturing of Brick and other Columns, by Horizontally Applied Motion," Professor Milne and F. Omori describe a very interesting series of experiments, wherein various objects such as blocks of wood of different dimensions, bricks, columns built of brick or of cement, were mounted on a wheeled truck to which a reciprocating horizontal motion could be communicated, and the circumstances of the motion, with the overturning or fracture of the object, were electrically recorded. From the data the maximum velocity and maximum accelleration necessary for overturning were calculated and compared with the experimental results with a fairly good agreement. In an article on "Earth Pulsations in Regard to Certain Natural Phenomena and Physical Investigations," Professor Milne concludes that "the movements called earth tremors are movements in the crust of the earth not altogether unlike the swell upon the ocean," and infers a connection between them and the steepness of the barometric gradient. In an article "On the Movements of Horizontal Pendulums," he gives an abstract with notes of certain observations made by Dr. E. von Rebeur-Paschwitz at Potsdam, Wilhelmshaven and Teneriffe, and published in the *Astronomische Nachrichten.* F. Omori gives "A Note on Old Chinese Earthquakes," and as the concluding article Professor Milne gives a twenty-page "Note on the Great Earthquake of October 28, 1891," the phenomena of which are further discussed in his report to the British Association, 1892, and the complete account of which is to be issued under the auspices of the Imperial University of Japan, but is not yet ready for publication. According to the statements of this account the killed numbered 9,960, wounded 19,994, and houses totally destroyed 128,750. The immediate cause of the disaster was the formation of a fault which can be traced on the surface of the earth for a distance of between forty and fifty miles, and shows a difference of level amounting in many places to twenty or thirty feet. There is also abundant evidence of horizontal displacements, sometimes as great as eighteen feet, and the whole Neo Valley appears to have suffered a permanent compression, becoming narrower, the piers of bridges being left closer together than before the earthquake. There were also many observations of surface waves in the earth, involving a perceptible tilting of objects resting upon it; and the maximum horizontal motion indicated by the instruments was from 25 mm. to 35 mm. with a period of from 1 to 2.5 seconds.

Notions de Chimie Agricole. Par TH. SCHLOESING, FILS. Paris, Gauthier-Villars et fils. Quai des Grands-Augustins, 55. 208 p. 8°. Broché, 2 fr 50. Cartonné, 3 fr.

FOLLOWING in the footsteps of the elder Schloesing, M. Th. Schloesing, Fils, Ingenieur des Manufacteurs de l'Etat, presents us with an admirable treatise on agricultural chemistry covering in detail the physical and chemical relations of soil and atmosphere