percentage of taxed property rising in Rhode Island to 60, though it falls in Connecticut to 38.4, and in Vermont to 30. In Vermont, also, the tax is very small (only $1,745,000); while New Hampshire, with scarcely more population, raised $2,698,000 by taxation, and Rhode Island, with 56,000 less people, raised $2,603,000. The estimated wealth of Rhode Island, however, was $420,000,000, while that of Vermont was but $289,000,000, and that of New Hampshire, $328,000,000.

The mode of exhibiting property, debt, taxation, etc., by pyramidal diagrams, — the largest states at the bottom, and so on, upward, — is a very effective one to the eye, far more so than the map-form of making such statistics impressive. A map, and an arrangement of divided disks and parallelograms, are also used to illustrate the ownership of the national debt, etc. These devices are a novel and increasing feature of statistical reports, and are doubtless useful to the general and casual reader; but scientific inquirers must be warned against making too much of them. Statistics themselves, in their most exact form, are apt to mislead as soon as comparisons are attempted; for then a multitude of qualifying circumstances come into view, or, if not seen, make the result of the comparison deceptive. To make these statistics still less exact by reducing them to the pictorial form, introduces a new element of error. The investigator must therefore be prepared to see these general views become dissolving views, as he extends his inquiry into the real facts, which the best collected statistics do but disguise with a thicker or thinner veil of imperfect classification.

## THE ABORIGINES OF CHILE.

*Los aborijenes de Chile.* Por JOSE TORIBIO MEDINA. Testo i láminas. Santiago, *Imprenta Gutenberg*, 1882. 427 p. 4°.

THE original sources on which we must depend for a knowledge of the ethnology of Chile are difficult of access, and Señor Medina has performed a meritorious work in collecting them in this volume. Nor is it a mere compilation. To a very full description of the Araucanian Indians he adds a discussion of the archeological relics of that country, such as up to the present we might have sought in vain. Some of his conclusions will be read with interest.

Although no unequivocal signs of quaternary man have been found in Chile, Medina mentions two or three discoveries of stone implements at great depths, one of which, as figured, has every appearance of a genuine quaternary celt. As is well known, in the contiguous territory of the Pampas, Ameghino has described undoubted and abundant human remains from quaternary deposits. At any rate, the state of preservation of the remains in the graves of the Araucanians seems to leave no doubt that they were relatively a late immigration. To the antecedent population the author attributes the curious petroglyphs which are not uncommon on the Chilian rocks. His effort, however, to make it appear that this earlier people was of a more civilized type, cannot be said to be successful.

Appended to the text are two hundred and fifty-two lithographs of archeologic finds. They include articles in stone, copper, silver, bronze, and pottery. Those in stone present some forms which are not at all, or not often, found with us. Such are the rounded and polished sling-stones,— a weapon popular in South America, but scarcely known in the northern continent. Stone implements for net-making are another curiosity. They are of the shape and size of a cigar, with grooves around each end. Perforated circular stones, about three inches in diameter, are extremely common, and, the author thinks, were used principally to add weight to agricultural implements, — a quite improbable theory. Both the stone implements and the pottery present markedly different degrees of technical skill. This the author explains chronologically, attributing the ruder to a much more ancient date; but the opinion that they merely represent different degrees of contemporary skill is equally probable.

Shell-heaps are numerous along the Chilian coast, some of them six metres in height; but mounds, earthworks, or walls are not described. No fresh information is furnished on the Araucanian language, and this part of the volume has slight value. The history of the Incarial conquest is detailed at length; but the influence of the Incarial culture on the southern tribes, which was very widely felt, is not allowed its proper prominence.

## NOTES AND NEWS.

THE Chesapeake zoölogical laboratory of the Johns Hopkins university was stationed this year at Beaufort, N.C., and was open from June 1 to Sept. 19. Owing to the illness of the director, it was most of the time under the charge of Prof. H. W. Conn. The embryology of echinoderms, annelids, and medusae, formed the principal studies. Dr. Brooks nearly completed his monograph of the medusae of Beaufort, and studied the embryology of Eutimia, besides

making some observations on the metamorphosis of stomatopods, to be incorporated in his report on those of the Challenger expedition. Dr. Conn completed his work on the development of Thalassema, and nearly finished a monograph on the crabs of Beaufort, on which he had been engaged for three years. He also studied the development of Serpula, and prepared a paper on larval forms. Dr. Donaldson investigated the physiology of marine vertebrates, making many experiments to determine the relative susceptibility of the different classes to poisons of vegetable origin. He also carried on a series of experiments to determine whether the current theory of digestion in Actinozoa is correct, and reached the conclusion that it was not. Mr. Bateson of England, who carried on his studies by a grant from the Royal society, completed his investigations upon Balanoglossus. Dr. Osborn studied the embryology of Fulgur and Neptunia, and the origin of the body-cavity and reproductive organs of gasteropods. Altogether, ten persons were engaged the whole or a portion of the time in study at the laboratory, and the result of their work has been of the highest importance.

— The first number of the seventh volume of the *American journal of mathematics*, which has just appeared, bears the name of Simon Newcomb, the successor to the chair of mathematics in Johns Hopkins university, as editor.

— The Hydrographic office reports that the bark Nellie T. Guest, which arrived at St. John, N.B., Oct. 20, from Barrow, on the 6th of October encountered in latitude 46° 10′ north, longitude 43° west, a cyclone, during which she lay four hours with decks full of water. Three bags of oil were towed over the weather side, and assisted greatly in smoothing the sea.

— By special request, Sir William Thomson delivered a lecture in Hopkins hall, Baltimore, Wednesday, Oct. 15, on the rigidity of the earth.

— The college for an advanced course of professional study for naval officers, to be known as the Naval war college, will be under the general supervision of the bureau of navigation. The principal building on Coaster's Harbor Island, Newport, R.I., has been assigned to its use, and has been transferred, with the surrounding structures and the grounds immediately adjacent, to the custody of the bureau of navigation for that purpose. The college will be under the immediate charge of an officer of the navy, not below the grade of a commander, to be known as president of the naval war college, who will be assisted by a faculty. The course of instruction will be open to all officers above the grade of naval cadet. Commodore S. B. Luce has been assigned to duty as president of the college.

— The Royal astronomical society has elected Prof. Edward S. Holden, director of the Washburn observatory at Madison, Wis., one of its foreign associates.

— The first annual meeting of the New-England meteorological society was held in Boston on Tuesday, Oct. 21. Sixty-four new members were elected, and the following communications were made: Rain-gauges, by Mr. Desmond Fitz Gerald of the Boston water-works; Rainfall maps, by Mr. W. M. Davis of Harvard college; Weather-observers in New England, by Professor Winslow Upton of Brown university; Establishment of a meteorological station on Blue Hill, Mass., by Mr. A. Lawrence Rotch of Boston.

— Mrs. Dr. Sophie Kowalevski has been elected teacher of mathematics in the new university at Stockholm. As Dr. Kowalevski read last winter a *privatissimum* on partial differential equations with noteworthy results, a new professorship was established for her in the university.

— The facts made use of in Hudson's 'Cause, nature, and prevention of seasickness,' are collected from the author's own experience of twenty-five years at sea. The book lacks a little in physiological accuracy. It, however, is a contribution to a form of treatment which is fast gaining in popular favor, namely, preventive medicine. The author concludes, that by the proper adjustment of the body to gravity and the ocean, through muscular relaxation, seasickness may be avoided.

— Hirsch, the well-known French engineer and author, reports to the Commission centrale des machines à vapeur the results of experiments upon the production of the superheated condition in the water of steam-boilers. Studying the history of such phenomena so far as they are recorded, and conducting a somewhat extended series of experiments, the conclusion was finally reached, that there is no evidence, up to the present time, that boiler-explosions may be caused by the conditions studied, or that such conditions ever arise in practice. If they occur at all, it is only in extremely rare instances, and as a consequence of a coincidence of circumstances seldom to be observed, and which are neither well understood nor well defined. The use of the thermometer is advised to determine the facts bearing upon this question. The commission to which the report is made approve and adopt these conclusions.

— The latest use to which the electric light has been put at the London health exhibition is the illumination of a baker's oven with a plate-glass door. The light was from two incandescent lamps, driven by a Victoria brush-machine, which were inside the oven, where the temperature was from 400° to 600° F., the whole oven being distinctly visible. No more burnt bread!

— The reduction of the French photographs of the transit of Venus, taken Dec. 6, 1882, gives a polar flattening of the planet about the same as that of the earth, viz., $\frac{1}{303}$. From measures during the transit of 1874, Lieut.-Gen. Tennant derived a compression, in the north-south direction, of $\frac{1}{259.3 \pm 77.6}$. There appears, thus, a strong presumption of a real flattening in this direction; which, however, is to be noted as inconsistent with the hitherto received determinations of the inclination of the equator of Venus to the ecliptic.

— Prof. E. S. Holden, director of the Washburn observatory of the University of Wisconsin, has lately collected all the data available for a discussion of the law of distribution of the fixed stars, so far as this is determinable from the method of star-gauging. The data were collected from a comparison with the results of a series of star-gauges in progress with the fifteen-inch equatorial of the Washburn observatory; and they include, 1°, the 683 previously published gauges of Sir W. Herschel, with the places brought down from 1690 to 1860; 2°, the 405 unpublished gauges of Sir W. Herschel, extracted from his observing-books, and generously placed at Professor Holden's disposal by Lieut.-Col. John Herschel (these also reduced to 1860); 3°, 500 counts of stars from the published charts of Dr. C. H. F. Peters; 4°, 983 counts of stars from the unpublished charts of Dr. Peters, from the Paris charts as revised by him, and from the unpublished ecliptic charts of Professor Watson; 5°, 856 counts of stars from the unpublished and published charts of Dr. J. Palisa. These, with the data from Sir J. Herschel's 605 southern gauges, and Celoria's *durchmusterung* of the stars between 0° and + 6°, complete the very valuable collection of data which Professor Holden has brought together in convenient tabular form, and from which one of his most important conclusions is, that the method of star-gauging must be applied to the study of comparatively small regions, and that the results from these are then to be combined into larger groups. Professor Holden hopes that these tables may serve the valuable end of finally disposing of the fundamental assumption that the stars are equally scattered in space, and may bring about the study of their distribution on a more general basis.

— Caspar Johann Bismarck was the editor, in 1694, of one of the most important geographical treatises of the seventeenth century, — the 'Introductio in omnem geographiam' of Philip Cluver, which passed through many editions between 1629 and 1730, and was annotated by various *savants*. Further investigation will be required to determine if this Bismarck belonged to the particular family which has produced the great German chancellor. He was, however, a native of the same region, — Wolfenbüttel in Braunschweig, a town about sixty miles west from Magdeburg. About fifty miles north from Magdeburg, a small town exists which seems to have given its name to the Bismarck family, though the orthography differs slightly. This village is situated in Altmark, a short distance from the River Biese; and its name, 'Bismark,' probably signifies 'market of the Biese.' The name of Bismarck is associated with geographical matters in another way. Before the revolution the students of the university of Orleans, which was then in a flourishing condition, were divided, as was then the fashion, into six 'nations,' two of which were the Normans and the Germans. At this time a certain Christopher de Bismarck was quaestor of the Germanic nation. In that capacity, according to Monseigneur Dupanloup, he held a disputation, celebrated in the annals of the university, with the Normans, claiming that Denmark and the Danes, in spite of their community of origin, belonged, not with the Norman, but with the Germanic nation.

— *Engineering* states that "the pneumatic machine employed by Wroblewski in liquefying and evaporating ethylene and oxygen to produce intense colds has also been recently used by him to evaporate liquid marsh-gas. He has thus obtained a temperature of — 155° C. to — 160° C., which is the temperature of ebullition of the liquid gas. It is a useful temperature as coming between the temperatures of —144° C. and —184° C., which are obtained with ethylene and oxygen; but it varies with the degree of purity of the gas. Oxygen, atmospheric air, nitrogen, and carbolic oxide, cooled with the marsh-gas, can be liquefied under feeble pressures, so that a chemist who succeeds in producing pure marsh gas easily and economically, will render a service to science."

— The periodical report of the City guilds of London institute for the advancement of technical education has just been issued, and gives an extended account of the examinations held at the end of May. A considerable increase is shown in the number of candidates, the total this year having been 3,635, as against 2,397 in 1883. The number of centres has been increased from 154 to 164. Carpentry and joinery were new subjects, and attracted 369 candidates; but metal-plate working, only 2, who did not succeed in passing. The results were considered satisfactory, but show the urgent need for more systematic technical instruction for those who are employed in factories and workshops.

— Dr. Schweinfurth is spending three months in Berlin, preparatory to a new journey through the Egyptian deserts, on behalf of the Berlin academy of sciences, which he will undertake next winter. Though botany is his own specialty, the survey of the desert forms the main object of his journey.

— According to the *Colliery guardian*, Mr. W. E. Garforth, mining-engineer of Normanton, has succeeded in perfecting an invention for the detection of firedamp in mines, which is as remarkable for its simplicity as for its efficiency. It consists of an ordinary India-rubber ball, without a valve of any description; but by the ordinary action of compressing the ball, and then allowing it to expand, a sample of the suspected atmosphere is drawn from the roof or any part of the mine without the great risk which now attends the operation of testing for gas, should the gauze be defective. The sample thus obtained is then forced through a small protected tube upon the flame, when, if gas is present, it is shown by the well-known blue cap and elongated flame. From this description, and the fact that the apparatus can be carried easily in the pocket, the value of this adjunct to the safety-lamp will be apparent. It is thought that explosions are caused frequently by the fire-trier himself, and that his death prevents the cause from being fully ascertained. This danger will now be altogether avoided, and it is said that the detector has been tried at several collieries with completely satisfactory results.

—The *Athenaeum* states that Sir Richard Owen's 'History of British fossil reptiles,' which has been upwards of forty years in preparation, is now ready for publication by Messrs. Cassell. On the preparation of the 268 plates with which the volumes are enriched, great labor and attention have been lavished. The edition consists of 170 copies only, each copy being signed by Professor Owen; and the plates from which the illustrations have been printed have been destroyed.

—The time of the glacial period in New Zealand has been studied by R. von Lendenfeld, whose survey in the New-Zealand Alps, partly corroborating and partly extending the results of Dr. von Haast's surveys, shows that the present glaciers are as large, and extend down as far, as those in Norway, where the mean annual temperature is 3° C., whilst in New Zealand it is 11° C. The greater expanse of water in the southern hemisphere, and the consequently greater amount of humidity in the air, and more copious rain and snowfall, are considered to be the cause of this. The sounds in the south-west coast are similar to the fiords in Norway, and the alluvial deposits at their upper ends are small. Scooped out originally by flowing water, these sounds remained unchanged during the period of subsidence of the land, and were not filled up with *dêbris*, because large glaciers occupied them during that time. As soon as these glaciers disappeared, the formation of the alluvial deposits commenced; and from the fact that the latter are small, and increasing rapidly in size from year to year, the author considers that the glacial period in New Zealand must have been very recent.

—The committee of Lloyds has received from the London board of trade a report concerning the surface-ventilation of the cargo of 2,050 tons of coal carried in the Sutherlandshire from Hull to San Francisco last year. The ship was fitted with tubes to enable the master to ascertain the temperature of the body of the cargo, as recommended by the report of the royal commission appointed to inquire into the spontaneous combustion of coal in ships. The voyage was perfectly free from fire. The commander, Capt. Inglio, highly approves of the tubes, and will continue testing the temperature. A record was kept, and the figures are on record at Lloyds.

—England, so far, is not taking a very prominent part in the International exhibition to be held at Antwerp next year, only about two hundred firms having applied. France especially takes a prominent part, the French government having voted seven hundred and fifty thousand francs towards the expenses of the undertaking, and appointed two official commissions; while the municipal council of Paris has promised a grant of a hundred thousand francs for the purpose of sending workingmen delegates from that city. Prince Rudolph of Austria has also influenced the Vienna chamber of commerce to make strong efforts on behalf of the concern. The United States will be well repesented; and the Dominion of Canada better so than the mother-country, as it gives both official recognition and a substantial credit. Germany is also making strong efforts to be officially represented.

—Mr. Clermont Ganneau, the French archeologist, has been describing for the benefit of his countrymen the antiquities of Palestine now treasured in London, and advises the formation of a vast Palestine museum and library, one of the departments of which should be "an extensive and animated panorama of the Holy City, and dioramic views of the principal localities and of characteristic scenes of popular life in Palestine, in order to add to this scientific combination an irresistible element of attraction and success. In short, in the centre of London should be created a representation as faithful, varied, and complete as possible, of Palestine, past and present, which would be as a living commentary on the Bible." England, says Mr. Clermont Ganneau, being 'so passionately fond of biblical studies,' would be the country most likely to carry out his ambitious project.

—Mr. Wood Mason of the Calcutta Indian museum has recently drawn up a report on those insects from which the tea-gardens of Assam most suffer. He says the tea-bug or 'mosquito-blight,' and the tea-mite or 'red spider,' are the only two insects which are at present known to do such injury as to materially diminish the profits of the owners. Both these insects pass their whole lives on the tea-plant, and have never been found on any other plant. Such, at least, is the result of the most careful investigation. The mite lives in societies on the upper portion of the full-grown leaves, beneath an exceedingly delicate web which it spins for itself as a shelter. It punctures the leaves, and then pumps out the liquid contents of the epidermis. The only remedy which has been discovered to check their ravages, and it has not proved very effectual, is to sprinkle the affected bushes with muddy water. The tea-bug is still more destructive, and particularly to the trees of the milder juice; for those which afford a strong and rasping liquor enjoy an almost complete immunity from its attack. Mr. Wood Mason appends to his report engravings of these destructive creatures.

—The *Cape times* says that a gigantic earthworm has been sent from the colony to Mr. Frank Biddard, the prosector of the Royal zoölogical society, who has been desirous of obtaining one of these monsters for scientific purposes. The Rev. G. Fisk, F.Z.S., with whom Mr. Biddard has corresponded on the subject, received the worm from Mr. H. W. Bidwell, who found it in the botanic garden at Uitenhage. The longest measurement of the creature yet taken reaches six feet five inches; but it is thought, if it were drowned, the measurement would extend to ten feet, this mode of extinction having an extremely relaxing effect on the frame or substance of the worm. The surface of the upper portion of the body shows a bright green color, of variable intensity, but otherwise it is a loathlful animal. Lumbricus microchaeta is the name by which it will be immortalized in the records of the Zoölogical society.