The practical utility of geological surveys is incidentally illustrated at several points in the volume, where it is shown that money, up to more than a million dollars in a single case, might have been saved by a good preliminary examination of the circumstances.

The world (if Ohio does not) must needs feel very grateful to Professor Orton and his assistants, some of them not contributors to the volume, for their largely gratuitous and very successful labors, and, congratulating him and them on having accomplished so much with such limited time and means, must hope that he may soon find himself able to publish at least one more volume on the several other economical subjects of high importance necessarily neglected this time.

THE WINDMILL AS A PRIME MOVER.

THIS treatise is intended to present the theory and the practice of construction and use of windmills, the history of this form of prime mover, its progress and development, and the economy attained in its application to the production of available power. It is a careful and conscientious study of the machines in use, of the theory of the transformation of the available energy of wind for purposes of application, and of the commercial aspect of the case.

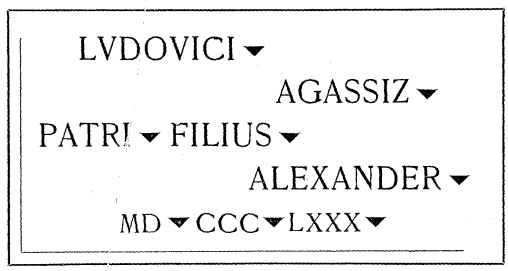
Here will be found an account of the extent to which windmills are used, and of the comparative value of these forms of motor and the steam-engine, the theory of wind-pressure, and the effect of air in motion upon the sails. The history of the construction and use of windmills is given with a description of the best known. The whole is a very complete treatise, and will probably take its proper place as the standard, the only real treatise upon this subject. It supplies a want, and will probably be extensively read.

The arrangement of the book seems to us excellent, the treatment good, the work, so far as we have been able to check it, accurate, and the conclusions correct. Chapters ii. and ix. on the construction of the formulas for effect, and on the commercial economy of the mill, are the most strikingly valuable parts of the book; and the former will interest the student of the theory of prime movers as greatly as the latter will interest the proposed user of the machine, and the practising engineer. The text is well written, the book-making excellent, and the whole book is an illustration of a kind of work which is always welcomed by the profession to which its author has presented it.

The windmill as a prime mover. By ALFRED R. WOLFF, M.E., New York. *Wiley*, 1885. 8°.

NOTES AND NEWS.

A LARGE stone slab has just been placed in the wall of the entrance hall of the newly completed portion of the Museum of comparative zoölogy, which was built by Dr. Alexander Agassiz at his own expense, and presented to Harvard college. The simple inscription reads as follows: —



— On the last day of August, according to *Nature*, Professor Michel Eugene Chevreul entered upon his 100th year. Apart from the fact, that, among men whose lives have been devoted to active scientific research, no one has before attained such an age, Chevreul stands conspicuous for the vast amount of work he has done, and for the great practical effect his work has had on the industries of the world. When Dumas, in 1852, addressed him on the occasion of handing to him the prize of 12,000 francs accorded to him by the Société d'encouragement pour l'industrie nationale, he said, "Le prix consacre l'opinion de l'Europe sur des travaux servent de modèle à tous les chemistes; c'est par centaines des millions qu'il faudrait nombrer les produits qu'on doit à vos découvertes." More recently, in 1873, when the award of the Albert medal was made by the English society of arts, the terms in which the council expressed the grounds of the award were, "For his chemical researches, especially in reference to saponification, dyeing, agriculture, and natural history, which for more than half a century have exercised a wide influence on the industrial arts of the world." His scientific work, apart from its commercial outcome, was recognized by the Royal society of London as far back as 1826, when he was elected a foreign associate. In 1857 the Copley medal was awarded to him. Other countries have also paid him honor, while the distinctions of his native land have showered upon him. Born in Angers in 1786, where his father was a physician of note, he was but seventeen when he went to Paris to be 'manipulateur' in the laboratory of the celebrated Vanquelin. At the age of twenty he published his first chemical paper, and in the next half-dozen years he had published more than a score on different subjects. Then began that series of papers (commencing in 1813), "Recherches chim-

iques sur plusieurs corps gras, et particulierment sur leurs combinasions avec les alcalis," which extended for many years. In 1824 he was appointed professor of chemistry at the famed factory of Gobelins; and the energy and untiring industry which was one characteristic of his work, soon accumulated stores of knowledge based on experiment. To exact experiment he attached the highest importance. He wrote in 1823, "Experiment is not chemistry, facts alone do not constitute that science; but we cannot have discoveries without exact experiment." His 'Recherches sur la teinture' is an elaborate work; and his 'Moyen de définer et nommer les couleurs' occupies the whole of vol. xxxiii. of the Mémoires of the Institut. It has often been remarked, that it is difficult to believe that the Chevreul of 'corps gras' fame, and the Chevreul who wrote on colors, are one and the same man.

— *Science et Nature* announces the following scientific missions: The naturalist Frédéric Bordas is in charge of a zoölogical expedition to the islands of Mascareignes, Seychelles, and Comores. Clermont-Ganneau has undertaken an epigraphical expedition to the islands of the gulf of Akaba, in the Red Sea. Jacques de Morgan, civil and mining engineer, has gone to study the geology and mineralogy of the Free Orange States, — Transvaal, Zululand, and Natal. Lieut. Palat is exploring the route from Sénégal to Algeria by way of Medina, Timbuctoo, Mabrook, Touat, and Gourara. Benjamin Balarsa has charge of a scientific mission to Tonkin, and Jules Borelli is directing an expedition of the same kind at Choa. The intrepid explorer, Serpa Pinto, to whom the Société de géographie granted the gold medal five years ago, is dangerously ill at Hibo, Africa.

— The present year is one of the most successful that the Annisquam summer school of zoölogy has ever seen. Fifteen students have been at work at the tables, all, with one exception, studying the development and anatomy of marine types, and making collections for teaching purposes. The number of states represented is much greater than in any previous year, showing that the reputation of the laboratory is fast spreading. There are students from Massachusetts, Connecticut, New York, Pennsylvania, North Carolina, Tennessee, Indiana, Wisconsin, and Michigan. The laboratory is under the direction of Mr. B. H. Van Vleck, who is himself studying the development of the dog-fish.

— King Oscar II. of Sweden has announced that he will award a prize, on the 21st of January, 1889, the sixtieth anniversary of his birthday, for an important discovery in the field of higher mathematical analysis. The prize will consist of a gold medal having a value of a thousand francs, together with a sum of two thousand five hundred crowns (somewhat less than seven hundred dollars). The commission appointed by the king to determine the conditions of the competition and to judge the papers presented consists of Weierstrass of Berlin, Hermite of Paris, and Mittag-Leffler of Stockholm. They have designated four subjects for competition, the first relating to the motion of a system of particles attracting one another according to Newton's law, the second to a certain class of uniform functions of two variables analogous to hyperelliptic functions, the third to functions defined by differential equations of a certain type, and the fourth to Poincaré's Fuchsian functions. In case none of the memoirs presented on the four subjects named should be deemed worthy of the prize, it may be awarded to a memoir (sent in for competition) containing a complete solution of some other important problem in mechanics or the theory of functions. The exact particulars are set out in a circular letter issued by Professor Mittag-Leffler.

— Circular No. 20 of the division of entomology of the department of agriculture relates to the recently-estabiished branch of economic ornithology, and consists of a statement of the subject to be investigated; namely, the inter-relation of birds and agriculture, and a series of questions calling for information respecting the food-habits of various species of birds, the nature and extent of their depredations, the reason of occurrence of the species, the number of broods raised in a season, the increase or decrease of particular species, etc. The circular, and also directions for the collection of birds' stomachs, will be furnished to all those willing to aid in the work, on application to Dr. C. Hart Merriam, ornithological agent, whose address will be Sing-Sing, N.Y., till Oct. 1; after this date, U. S. department of agriculture, Washington, D.C.

— The latest from Bering Strait brings news of the whaling fleet to July 12. At that date a hundred and ten whales had been taken by seven steamers and twenty-six barks. Three vessels were reported 'clean,' the remainder having from one to nine whales. The usual percentage of disasters are reported. Bark Napoleon, Capt. Smith, was crushed and foundered in lat. 58°, W. long. 177°, about the middle of Bering Sea, on the 5th of May. Her crew took to the boats; and, after a heavy gale four days later, two of these boats were rescued, several men having died of exposure, and the remainder missing, making a total loss of twenty officers and men. Bark Gazelle was stove by a pointed tongue of ice June 3, twenty-five miles south-east from the south-west cape of St. Lawrence Island. The damage was done so quietly that the first intimation had of it was the report of the mate that the hold was full of water. Three hours later she sank; the boats reached the island or other whalers in safety, and were kindly cared for by Capts. Marvin, McGregor and Hayes of the Arnolda, Abram Barker, and Hamilton. The steamer Balaena was badly stove, but was subsequently repaired by the master, and continued her voyage, which bids fair to be a good one, as she was reported with eight whales. The catch is unusually good for the time of the year to which we have reports, and an equal average to Oct. 1 will make a very prosperous season. Whalebone to the value of $150,000 was brought down by the schooner Garfield, mail-carrier and tender to the fleet. Some of the vessels got into the Arctic by the east shore before the whales did, and got nothing; while the vessels south of the strait were killing. On June 10

the whales began to pass the strait; and on the 19th fifteen were struck by the Balaena and Alliance, of which thirteen were saved.

— The Hydrographic office has just issued a pamphlet (No. 77) entitled 'Practical hints in relation to West-Indian hurricanes,' being a translation by Lieut. Dyer of certain conclusions given by Padre Viñes of Havana, 'Apuntes relativos a los huracanes de las Antillas.' It includes a concise description of the weather preceding a hurricane, laying especial weight on the rise of the barometer, and the consequent anti-cyclonic winds outside of the cyclonic circulation; of the first appearance of the storm-clouds and winds, and the means of determining the bearing of the centre; of the tracks usually followed by these cyclones, and of the best means of escaping them. In speaking of the direction of the wind in the storm, a little fuller statement would seem necessary to avoid danger of being misunderstood. For example, it is said (p. 8), "As a rule, the lower currents converge, forming with the bearing of the storm-centre a variable angle, which is almost always greater than a right angle." By the use of the word 'converge,' the reader at once is led to consider the direction in which the lower winds are blowing spirally around the storm-centre; but, when looking in this direction, the angle between the wind and the storm-radius will be generally *less* than a right angle. Again: the table on p. 9 states, 'If the nimbus clouds and squalls move N., the centre will bear E.,' etc.; this surely ought to be 'move *from* the N.' It is well that the excellent work done by Viñes is thus in part brought before our naval officers; for, although it is some years since his conclusions were translated in Ferrel's 'Meteorological researches for the use of the coast pilot' in the coast-survey reports, we fear that some of our lieutenants have failed to read them.

— Among recent deaths we note the following: Professor Fleming Jenkin of the University of Edinburgh, June 12, in his fifty-third year; George Witz, chemist, at Rouen, June 17, in his forty-ninth year; Prof. A. W. Eklund, at Lund, Sweden, in his ninety-first year; and Dr. T. Clausen of the Dorpat observatory, May 25, in his eighty-fifth year.

— Prof. John Le Conte of California prints in the *Overland monthly* for August, 1885, an excellent argument in favor of the employment of the metric system.

— *The museum*, formerly published at Philadelphia, has been merged with the *American antiquarian*, published at Clinton, Wis. *The young mineralogist and antiquarian* has been suspended.

— The title of Rieger and Tippel's pamphlet (Experimentelle untersuchungen über die willensthätigkeit. Jena, *Fischer*, 1885. 48 p. 8°) is rather too pretentious for its content. The activity of the will, studied by the authors, is the holding out of the hand, as steadily as possible, for two minutes. The hand is found to waver slightly, and usually to sink somewhat without the subject becoming aware of the change. Dr. Rieger described his method of tracing its motions in his former book on hypnotism. The patient holds a pin between his fingers. The pin's shadow is cast on the drum of a chronograph, where some one keeps a pencil-point upon its head whilst the drum revolves. Nine plates give specimens of the many curves thus obtained. Either phlegmatic stolidity, or normal strength of will, makes them level and regular. Hysteric mobility makes them irregular. Dementia may make the line sink very rapidly. In certain states of cerebral irritation with tendency to contraction of the flexors, the line rises instead of sinking. Tremor and hemiplegia give vibrating curves. The administration of amylnitrite acts differently in different persons. Usually, however, it makes the curve worse. This is especially the case in delirium tremens. Many a mickle makes a muckle; and, out of such small facts as these, something worth knowing about voluntary activity may some day be inferred. What Dr. Tippel has to say of the influence of amylnitrite on the brain-circulation, will be found worth reading by those whom it concerns.

— It is rare, indeed, that a scientific article prepared nearly forty years before, and familiar by copious extracts, merits publication in full as still the best work in its own special field. Yet few will contest that such is the case with Mr. Aubin's celebrated essay on "La peinture didactique et l'écriture figurative des anciens Mexicains." All students of the subject are familiar with the remarkable results which he reached; but the full evidence of his statements, his proofs, in other words, that the Aztec hieroglyphic writing is, in a measure, phonetic, has never been submitted. In spite of the productive labors in the same field of the late Señor Ramirez, we find, in several of the most recent authoritative works on Mexico, the phonetic character of the ancient writing wholly denied. Now, however, the French government has published Mr. Aubin's essay complete, revised by the venerable author himself, and edited by the competent conservator of the museum of the Trocadéro, Dr. Hamy. Five beautifully executed chromo-lithographic reproductions of Mexican codices accompany the essay, and serve as undeniable testimony to the accuracy of the author's rendering of the text, as they contain a translation in Nahuatl of the figures. It cannot be said that the publication develops the theory to any further extent than did the original article in 1849; but the evidence on which it rests is for the first time submitted in a form satisfactory to students. The publication is one of the issues of the "Mission scientifique au Mexique et dans l'Amérique Centrale."

— Bulletin No. 1, new series, of the New-York agricultural experiment station, contains an analysis and valuation of 'Mason's high-grade potash fertilizer,' manufactured in Binghampton, N.Y., showing it to be an unmitigated swindle; a ton of it being worth, according to the station's liberal estimates, about a dollar and a half, while the selling-price is thirty dollars. The reprint of the manufacturer's circular, which makes part of the bulletin, is one of the best specimens of pseudo-science which it has lately been our fortune to meet.