

number of experiments of a special and general nature, carried on at his suggestion in different parts of the country for the purpose of studying the demands of our chief crops for various fertilizing materials. In a general discussion of the results, he concludes that corn responds but little to nitrogen, being able to gather its small supply from natural sources, and, for this reason, is not to be regarded as an exhausting, but more nearly a renovating crop. It responds, however, liberally to supplies of mineral fertilizers, phosphoric acid or potash being the dominant under different circumstances, depending upon soil and season. Potatoes have been found to respond uniformly to all the fertilizing ingredients; and they have less capacity than corn for gathering from natural sources. The same is apparently true for turnips. For other crops the number of experiments does not justify conclusions. Practically the largest average yield for all crops was obtained with the complete fertilizers. Nitrate of soda, and superphosphate, yield less than potash and superphosphate, which is significant of the value of potash, and the propriety of adding more of it to our fertilizers. Nitrate of soda, and potash, proved the least efficient. Separately, the nitrate of soda was rarely useful, the sulphate of lime frequently, the muriate of potash very often, and the superphosphates generally. Soils vary widely in their capacity for supplying food to crops, and consequently in their demands for fertilizers; and there are many conditions affecting their action after application. The only way to find what a particular soil wants is by careful observation and experiments.

Lawes and Gilbert's paper on the sources of nitrogen in crops, read at the meeting of the American association at Montreal, is appended to Professor Atwater's report. After maintaining that there is much more experimental proof of the fact that the soil is the source of nitrogen for all crops than that any can be assimilated from the air, a comparison is made between the comparatively recently broken-up soils of America and those of England, which have been long under arable cultivation. Analyses of four soils from the west show a much greater percentage of nitrogen than was found in those at Rothamsted; or, in general terms, the surface-soils of our territories are more than twice as rich in nitrogen as the average Rothamsted soil. In the face of this fact, the difficulty arises as to why less wheat can be raised upon the rich soils of the north-west than upon the worn-out soils of England. As far as they are informed, these writers attribute this result to vicissitudes of climate, and lack of care in cultivation.

This conclusion can hardly be considered as satisfactory; and it remains a question worthy of the greatest attention, as also whether these now rich soils are not being impoverished by the present method of cultivation.

NOTES AND NEWS.

—The gold medal of the Royal astronomical society has this year been awarded to Dr. Benjamin Apthorp Gould, for his '*Uranometria Argentina*.' In his address before the society, Feb. 9, on the presentation of the medal, the president, Mr. E. J. Stone, lately her Majesty's astronomer at the Cape of Good Hope, and now the director of the Radcliffe observatory at Oxford, made allusion to the number and variety of Dr. Gould's astronomical papers, which treat of almost all branches of the science, and es-

pecially to his reduction of D'Agelet's observations, — a work of considerable extent and of great value. All these were not without their influence in guiding the decision of the council in the award of the medal; but their attention was chiefly concentrated on Dr. Gould's direction of the work of the observatory at Cordoba, in the Argentine Republic. The principal part of this work may be considered an extension of Argelander's scale of magnitudes to all the stars which can be seen by a good eye, without instrumental aid, between ten degrees north declination and the south pole, together with a series of charts exhibiting on a stereographic projection the positions of all these stars to the sixth magnitude, and a proposed revision of the boundaries of the southern constellations. This was the work first undertaken by Dr. Gould on his arrival at Cordoba, with four assistants, thirteen years ago. Some indication of the magnitude of the work may be obtained from the fact that the number of estimations made for the formation of the '*Uranometria Argentina*' exceeded forty-six thousand. Dr. Gould has carefully discussed the results of these estimations of stellar magnitude, and compared them with nearly all the materials which were available for the purpose; and, in particular, he has compared his estimations of the magnitude of the brighter stars with results obtained from a discussion of the photometric observations of the second Herschel and of Seidel.

The maps published by Dr. Gould are fourteen in number, one of which is a skeleton-map showing the proposed revision of the boundaries of the southern constellations. The materials collected in this *uranometry* are far more complete and accurate than any which previously existed; and Dr. Gould has therefore been naturally led to discuss their bearing on those great questions of the constitution of our stellar universe which offer so fascinating and inexhaustible a field for philosophical speculation. The results which he has obtained are in general accordance with those of previous investigators of the subject. It appears to be clearly proved that distance is one of the most important factors in producing differences of apparent brightness in the stars; but the agreement between the number of stars of different magnitudes, and the number which might be expected if these changes of apparent brightness depended solely on distance, is not perfect over any large range of magnitudes. There appears to be a decided preponderance in the number of the brighter stars. It is possible that this preponderance may be partially due to the conventional scale of magnitudes not being a truly photometric scale. Dr. Gould has been led, after a careful discussion of his own observations, to infer that the preponderance of the brighter stars is due to the existence of a stellar cluster consisting of some four or five hundred stars, of which our own system is supposed to be a member.

The position of the northern pole of the medial plane of this belt of stars has been fixed by Dr. Gould at R. A. 11 h. 25 m., N. P. D. 60°, whilst that of the galactic circle is at R. A. 12 h. 41 m., N. P. D. 62° 39'.

— The notes on the progress of astronomy during the past year, brought before the Royal astronomical society at its anniversary meeting, Feb. 9, related to the following subjects: small displacements of the plumb-line; investigations relating to the tides; the micrometric measures of the Harvard-college observatory; double star observations; Oppolzer's 'Syzygien-tafeln'; the constant of precession; the mass of Jupiter; discovery of minor planets in 1882; M. Gogou on a lunar inequality of long period, due to the action of Mars; the celestial charts of Prof. C. H. F. Peters; Professor Holden's monograph of the nebula of Orion; the Harvard-college observatory catalogue of stars for 1875; Dr. Huggins's photographs of the corona; astronomical photography; Houzeau's 'Bibliographie d'astronomie'; the transit of Venus; the comets of 1882; and Professor Langley's researches on the solar radiation.

— Col. Prejevalsky has given up his projected expedition to eastern Turkestan, and will probably, instead, be sent as chief of a government expedition to determine the boundary between Siberia and Mongolia.

— J. Martin is exploring the mountainous country of Siberia south of Yakutsk. His last report, dated November, mentions excessive cold, with a minimum of -56° F., in which his party has suffered greatly. In spite of the general snow, he has made some observations on the rocks of the country, but details are not yet given.

— The annual report for 1882 is the latest example of the excellent work done by the Geological survey of New Jersey under the lead of Professor George H. Cook. It contains a well-colored state map (scale six miles to an inch), besides small outline-maps showing the river-basins and the progress of triangulation and topographic work. Chapters are given on the triassic formation; on the iron industry, showing an estimated output of 900,000 tons in 1882, — an excess of 140,000 over 1881, and larger than ever before; on the plastic clays, showing that the generalizations made in the special clay report and map (1878), are verified by recent work; on shore-changes, chiefly by erosive wave-action, proved by comparison of old and new surveys, amounting to two and three hundred yards at several places south of Barnegat Inlet; proved also by the discovery, at very low water after storms on Long Beach, of roots and axe-cut stumps, as well as horse and cattle tracks preserved in the firm sod of old marshes (p. 82); on water-supply, giving important statistics of rainfall, drainage-areas, and analyses; and recommending the boring of artesian wells, which the structure of the Atlantic slope would favor along the seashore, where the surface-water is

generally poor. The probable depths at which water-bearing strata would be found are given for several points on the coast. Other topics are also treated. The expenses of the survey have been kept strictly within the appropriation of \$8,000 a year.

The chapter on the triassic rocks has special technical value. It is remarkably well illustrated by tinted lithographs by Bien, showing the general triassic landscape at Plainfield, the columnar structure of the trap at Little Falls on the Passaic, the Palisade trap at its intrusive junction with the sandstones at Weehawken (a three-foot horizontal interbedded branch-dike in the lower part of this plate is colored like the sandstone), and the intrusions of trap between the shales at Martin's dock on the Raritan. The latter are much better than any illustrations of the triassic traps yet published. The working hypothesis adopted to explain the peculiarities of this puzzling formation seems open to criticism. The original connection of the New-Jersey and Connecticut sandstone areas is very improbable. Their similarity results rather from similarity of original conditions than from continuity. We believe that further observation will show the parallel Wachung Mountains to be, not intrusions, like the Palisades, but overflows of trap poured out on the sandstones during their formation, and altogether inactive in producing any perceptible share of the well-known monoclinical tilting. The curved form of these trap-ridges, and probably of all the many others of overflow origin in Connecticut, is the result of the trap-sheets having been faintly folded, with their conformably enclosing sandstones, long after their formation, and most likely at the time of general tilting. It is difficult to understand how any eruptive force would 'necessarily' produce such forms. The discovery of a few faults in the sandstones since 1868, when none had been found, gives hope that the origin of the monoclinical structure may some day be better understood. Apart from these somewhat hypothetical matters, an extended description is given of the character and distribution of the triassic rocks, for the purpose of enlisting the aid of local observers, whose contributions are much needed to 'solve the questions still open.' New Jersey is fortunate in having already progressed so far, and in having the road for further work so well marked out.

— Mr. G. Brown Goode has been appointed by the President commissioner to the London fisheries exhibition. Mr. R. E. Earll, Mr. A. Howard Clark, Capt. J. W. Collins, Mr. W. V. Cox, Capt. H. C. Chester, and Mr. Reuben Wood accompany the commissioner. Representatives of the Signal-office, U.S.A., Light-house board, and Life-saving service, have also been detailed for special duty in connection with the exhibition.

— The Marquis Antonio de Gregorio announces from Palermo, Feb. 9, that, if four hundred subscrib-

ers can be obtained, he will publish a Journal of geology and paleontology, which he hopes will become an international magazine, since he will accept articles written not only in Italian, but also in English, French, and German. It is to appear on alternate months, and contain from fifty to a hundred quarto plates a year. The subscription price is fixed at thirty scudi (dollars).

—The fifth annual meeting of the Ottawa field-naturalists' club was held on Tuesday, March 20. The report of the council shows that the club continues successfully the work for which it was organized. Three excursions were held during the summer, and five *soirées* during the winter. The club received during the year many valuable donations and exchanges, and published Transactions (No. 3), consisting of sixty-six closely printed pages, and two good plates. The number of members is a hundred and eight. Sixteen new members have been elected during the year. Notwithstanding the cost of publishing transactions, and increased general expenses, the club has a satisfactory balance on hand. The following officers were elected for 1883-84: president, H. B. Small, M.D.; vice-presidents, R. B. Whyte and Prof. J. Macoun; secretary, W. H. Harrington; treasurer, W. P. Anderson.

—Dr. George M. Steinberg has written a book, soon to be published, on 'Photomicrographs, and how to make them,' which will be illustrated with seventeen heliotype plates.

—In SCIENCE, p. 192, column 1, lines 10, 11, the clause, "the coal next the mouth not partaking of the motion of that farther in the hill," belongs to the preceding, and not the succeeding sentence.

RECENT BOOKS AND PAMPHLETS.

Arnold, G. M. Robert Pocock, the Gravesend historian, naturalist, antiquarian, and printer. London, *Low*, 1883. 8°.

Bonnier, G., et Leignette, A. Premiers éléments des sciences usuelles. Leçons des choses: or, argent, monnaies. Paris, *Dupont*, 1883. 36 p., illustr. 12°.

Boston society of natural history. Constitution and by-laws, with a list of officers and members. [Boston], 1883. 35 p. 16°.

Braconnier, M. A. Description géologique et agronomique des terrains de Meurthe-et-Moselle. Nancy, *imp. Berger-Levrault et Cie*, 1883. 444 p., illustr. 8°.

Bradshaw, J. New Zealand as it is. London, *Low*, 1883. 8°.

Brogie, duc de. La science et la religion: leur conflit apparent et leur accord réel; leçon d'ouverture du cours d'apologétique chrétienne professé à l'Institut catholique de Paris. Paris, *imp. Levé*, 1883. 62 p. 18°.

Cadet, F. Lettres sur la pédagogie, résumé du cours de l'hôtel de ville (mairie du 3^e arrondissement). Paris, *Chais*, *imp.*, 1883. 310 p. 16°.

Caspari. Détermination de positions géographiques en Cochinchine. Paris, *imp. nationale*, 1883. 30 p. 8°.

Cassino, S. E. The international scientists' directory; containing the names, addresses, special departments of study, etc., of amateur and professional naturalists, chemists, physicists, astronomers, etc., in America, Europe, Asia, Africa, and Oceania. Boston, *Cassino*, 1883. 8+150+299 p. 12°.

Catalogue de la collection archéologique provenant des fouilles et explorations de M. Désiré Charnay au Mexique et dans l'Amérique centrale pendant les années 1880, 1881, 1882, exposée provisoirement au palais du Trocadéro. Paris, *Tremblay*, 1883. 14 p. 8°.

Charles, E. Lectures de philosophie, ou Fragments extraits des philosophes anciens et modernes. 2 tom. Paris, *Belin et fils*, 1883. I., 8+556 p. II., 590 p. 12°.

Charpentier, A. Étude de l'influence de la coloration sur la visibilité des points lumineux. Paris, *imp. Davy*, 1883. 7 p. 8°.

— Note complémentaire relative à l'influence de la surface sur la sensibilité lumineuse. Paris, *imp. Davy*, 1883. 7 p. 8°.

Church, A. H. Precious stones considered in their scientific and artistic relations; with a catalogue of the Townshend collection of gems in the South Kensington museum. With a colored plate and woodcuts. London, *Chapman*, 1883. 116 p. 8°.

Dauge. Leçons de méthodologie mathématique à l'usage des élèves de l'école normale des sciences, annexée à l'Université de Gand. Gand, *G. Jacquain*, 1883. 416 p. 4°.

Delage, A. Éléments d'histoire naturelle des pierres et des terrains (programmes officiels du 2 août, 1880), pour la classe de quatrième. Paris, *imp. Martinet*, 1883. 173 p., illustr. 16°.

Eve, H. W., Sidgwick, A., and Abbott, E. A. Three lectures on subjects connected with the practice of education, delivered in the university of Cambridge in the Easter term, 1882. Cambridge, *Cambridge Warehouse*, 1883. (Pitt press series.) 92 p. 12°.

Fabre, G. Étude sur les eaux minérales de Caprem (Hautes-Pyrénées). Paris, *imp. Davy*, 1883. 56 p. 8°.

Greer, H. The storage of electricity. N.Y., *Coll. electr. eng.*, 1883. 40+14 p. 8°.

Hamard. L'Age de la pierre et l'homme primitif. Lyon, *imp. Wallener et Cie*, 1883. 13+503 p., illustr. 18°.

Hanstein. Le Protoplasma considéré comme base de la vie des animaux et des végétaux. Traduit de l'allemand. Paris, *Coulommiers*, 1883. 132 p. 18°.

Hoffman, F., and Power, F. B. A manual of chemical analysis as applied to the examination of medicinal chemicals. Philad., *Henry C. Lea's Son & Co.*, 1883. 628 p. 8°.

Hull, E. Contributions to the physical history of the British Isles. With a dissertation on the origin of Western Europe and of the Atlantic Ocean. London, *Stanford*, 1883. 150 p., illustr. 8°.

Jacques, V. Éléments d'embryologie, leçons recueillies à l'Université de Bruxelles. Bruxelles, *H. Manceaux*, 1883. 108 p., illustr. 12°.

Kengla, Louis A. Contributions to the archeology of the district of Columbia; an essay to accompany a collection of aboriginal relics, presented for the Toner medal, 1882. Washington, *Waters, pr.*, 1883. 4+42 p., 5 pl., map. 8°.

Lorentz, B., et Parade, A. Cours élémentaire de culture des bois créé à l'école forestière de Nancy. Paris, *Poitiers*, 1883. 28+721 p. 8°.

Malley, A. C. Micro-photography; including a description of the wet collodion and gelatino-bromide processes; together with the best methods of mounting and preparing microscopic objects for micro-photography. London, *Lewis*, 1883. 142 p. 8°.

Morelle, E. Recherches chimiques sur la bergénite. Lille, *imp. Danel*, 1883. 30 p. 8°.

North Carolina—Agricultural experiment station. Second biennial report of the director, Charles W. Dabney. 1881-82. Raleigh, *State*, 1883. 24 p., pl. 8°.

— *The same.* [Bulletins.] i.-iv. 3 nos. [Raleigh], 1883. 20, 32, 16 p. 8°.

Page, D. Advanced text-book of physical geography. 3d ed., revised and enlarged by Charles Lapworth. London, *Blackwoods*, 1883. 350 p. 8°.

Pillsbury, J. H. Development of the planula of Clava leptostyla, Ag. N.Y., *Thompson & Moreau, pr.*, 1882. 3p., 1 pl. 8°.

Report of the scientific results of H.M.S. Challenger. Zoölogy, vol. vi. London, *Longmans*, 1883. 4°.

Rogers, J. E. T. Ensilage in America; its prospects in English agriculture. London, *Sonnenschein*, 1883. 162 p. 8°.

Rollet, J. Influence des filtres naturels sur les eaux potables. Lyon, *imp. Giraud*, 1883. 16 p. 8°.

Romanes, G. J. Animal intelligence. N.Y., *Appleton*, 1883. (Intern. sc. series.) 14+520 p. 12°.

Scott, R. H. Elementary meteorology. London, *Paul*, 1883. (Intern. sc. series.) 420 p., illustr. 8°.

Teale, T. P. Economy of coal in house fires; or, how to convert an ordinary fire grate into a slow combustion stove at a small cost. London, *Churchill*, 1883. 50 p., illustr. 8°.

White, W. F. Ants and their ways. With an appendix giving a complete list of genera and species of the British ants. London, *Religious tract society*, 1883. Illustr. 8°.

Wild flowers of Switzerland; or, a year amongst the flowers of the Alps. By H. C. W. London, *Low*, 1883. 76 p. 4°.