changes that render it softer; but it is highly questionable whether the sodium-salts which it contains are derived from the preservation of original sea-water. The amount of sodium chloride has, however, been found to decrease in certain localities where pumping has been in progress for some time, and Mr. Barrow suggests that a part of the replaced calcium has passed into the form of a calcium-salt in the interstitial matter of the rocks.

Exceedingly important are his remarks on the relation of the water-supply in the Chalk to the geological structure. Not only are the effects of heavy loads of Eocene strata adverse to fissures and free circulation of water in the Chalk, but it is important to consider the undulations and faults in that formation. Thus the passage of water through the Chalk, apart from fissures, is dependent on the water-level, and is influenced by the lithological nature of the Chalk, and still more by the pressure of the head of water towards the margins of the basin. The consideration of these matters is greatly helped by two colour-printed maps prepared by Mr. Wills. One shows the contours in the underground water-surface or water-table of the London District for 1911; and the other shows the contours in the Pre-Tertiary Chalk surface, or, in other words, the height above or depth below Ordnance Datum at which the Chalk occurs where overlain by Eocene strata. Small maps are also inserted, for comparison, to show the underground water-contours in the London Chalk in 1878, between 1890 and 1900, and in 1911. Mr. Barrow is thus able to discuss the areas of maximum and minimum water-supply, and the causes for the distribution and local depletion. Moreover, the question of the drawing in of impure water from the valley gravels, where they directly overlie Thanet Sand and Chalk, and possibly of water from the Thames in certain low-lying localities, is engaging serious attention, as noted some few years ago by Mr. Clayton Beadle.

The effects of pumping carried out towards the margin of the London Basin are to decrease the head of water that would otherwise press towards the centre of the basin; moreover, the underground circulation is affected by the light or heavy loaded Eocene areas, as well as by the character of the Chalk itself. Mr. Barrow regards it as urgently necessary to raise once more the water-level in the London Basin, and suggests that much might be done by means of dumb-wells on the outskirts of the London District. Needless to say, his essay is one that will repay attentive study by all interested in the subject of water-supply from the Chalk.

V.—Brief Notices.

1. Union of South Africa: Mines Department.—We have received the Annual Reports for 1911 of the Geological Survey of the province of Transvaal (pt. iii, 1912, price 7*s.* 6*d.*). This volume contains a useful map, scale 1 inch to 30 miles, showing the areas surveyed up to the end of 1911. It may be mentioned that the report of the Director, Mr. H. Kynaston, is printed in Dutch as well as in English. The field-reports include one on "The Lower Witwatersrand System on the Central Rand", by Dr. E. T. Mellor,

and therein he has been able to adopt a definite classification and nomenclature for the strata, which should be applicable to the whole of the Witwatersrand area. The Director contributes a report on "The Geology of a portion of the Rustenburgh District, lying north of the Pilandsberg", and Dr. W. A. Humphrey describes "The Geology of the Pilandsberg", a remarkable igneous complex which is considered to mark an important centre of eruption of the elæolite-syenite magma. In addition to the field-work in the Transvaal an area of 342 square miles was mapped in Natal near Vryheid by Dr. Humphrey, who contributes "Notes on a traverse through parts of the Vryheid District and Zululand". There is also a short "Report on the Coal Resources of South Africa". The maps, sections, and pictorial illustrations in this volume are well executed and instructive.

2. Cainozoic Mollusca from South Africa.—The importance of careful collecting has received further emphasis from the report of Mr. R. Bullen Newton on some Cainozoic shells from South Africa (Records of the Albany Museum, vol. ii, No. 5, February, 1913, pp. 315–52—not 251–88 as in author's copies—pls. xvii–xxiv). The author describes a number of marine mollusca from the Cainozoic deposits of South Africa which form part of the 'Alexandria Formation' of Professor Schwarz, and are attributed to a probable Mio-Pliocene horizon. Attention is drawn to the fact that this formation was originally considered as of Cretaceous age on account of the occurrence of *Melina* cf. *gaudichaudi* in the upper part of the Need's Camp Limestones near East London. This had previously been described as a Cretaceous shell by Mr. Henry Woods under the name of *Perna* sp. This form of *Melina*, however, is proved to exhibit affinities with a South American Miocene shell, while it occurs in other districts of South Africa where the Alexandria formation is exposed in association with forms of mollusca showing a late Tertiary facies. It is explained that the Need's Camp deposits, as first demonstrated by Dr. A. W. Rogers, consist of an upper and a lower series of limestones distant some two miles from each other. The upper or younger beds contain this Tertiary *Melina* cf. *gaudichaudi*, while the lower or older beds are characterized by Polyzoa, etc., of undoubted Cretaceous age.

The Bemrose collotypes from photographs by H. C. Herring, of the British Museum, are extremely good and deserve a word of praise. The combination of a good photograph and a good collotype leaves little to be desired in the illustration of fossil mollusca.—C. D. S.

3. Water-Supply Papers of the United States Geological Survey.—We have received Nos. 284, 289–91, 296, 298, and 304 of these papers, and they deal with the surface-waters of the St. Lawrence River, the Colorado, the Great Basin, and the Sacramento River Basin, also with the waters of the Pacific Coast in California. Two of the papers constitute a gazetteer of the surface-waters of California. Of more geological interest is the paper, No. 294, entitled "An Intensive Study of the Water Resources of a part of Owens Valley, California", by Mr. Charles H. Lee, 1912. This valley lies in East Central California, and receives its water-supply from precipitation

on the eastern slope of the Sierra Nevada. It is an enclosed basin, so lined by impervious rock-formations that its ground-waters have practically no subterranean outlet. The only outlets for the water are afforded by evaporation from water-surfaces and damp soil and transpiration from vegetation. The alluvial material which forms the "valley fill" varies in size from large boulders to fine clay; and in arrangement it is partly mixed and partly in layers of well-assorted gravel, sand, and clay. It includes materials of the outwash slope and of the valley floor, the underground supply of water being obtained by percolation from precipitation on the surface, from stream channels, and irrigation. The surface area of the valley fill is reckoned to be 230 square miles, and its depth in places approaches 2,000 feet. Allowing an average depth of 1,000 feet, and having regard to the porosity of the material, it is estimated that nearly eleven cubic miles of water are stored. It is, however, remarked that the amount to be derived for practical purposes could not exceed that of the natural loss or overflow.

4. Building and Ornamental Stones of Canada.—Parts i and ii of a Report on these subjects has been prepared by Dr. W. A. Parks and issued in one volume (Ottawa, 1912, pp. 376). The first part consists of a general introduction to the subject, dealing with the chemical, physical, and geological features of building-stones, and with the methods of quarrying, testing, and preparing stone for the market. The materials include granite and other igneous rocks, sandstones, limestones, and slates. Many illustrations of quarries and of machinery are given. The second part consists of a systematic description of the building and ornamental stones which occur in that part of Ontario lying south of the Ottawa and French Rivers. It is prefaced by an outline of the geology of Ontario. Full particulars are then given of the various building-stones and marbles, illustrated with views of edifices in which particular stones have been used, views of quarries, and maps. There are also a number of coloured plates of limestones, dolomites, and sundry marbles, including sodalite. This mineral, the blue variety of which is regarded as one of the most beautiful decorative stones in Canada, is practically confined to Ontario, inasmuch as it is not known to occur elsewhere in sufficient bulk to be of economic importance. It is found as segregations in a belt of nepheline syenite, and can be obtained in slabs up to 4 feet square. In composition, sodalite is a silicate of sodium and aluminium, in which some chlorine is present.

REPORTS AND PROCEEDINGS.

Geological Society of London.

February 5, 1913.—Dr. Aubrey Strahan, F.R.S., President, in the Chair.

The following communications were read:—

1. "On Two Deep Borings at Calvert Station (North Buckinghamshire), and on the Palæozoic Floor north of the Thames." By Arthur