The Hydrography and Geology of Umbria.[1]

IN the volume before us, the Royal Italian Geological Survey has published, as the latest of its classic "Memorie descrittive," Dr. Bernardino Lotti's comprehensive work on that region which comprises the present Province of Perugia. A distinguished member of that Survey for forty-seven years, and latterly, down to the time of his retirement, director of the same, Dr. Lotti, as field geologist and chief engineer of the Mining Department, has contributed to the quarterly *Bollettino* of that Survey and other scientific periodicals as many as 200 papers, chiefly on his special sphere of central Italy, including his standard memoirs on Tuscany and the Island of Elba.

The volume was only recently completed in Dr. Lotti's retirement, in which he has now reached his eightieth year. It covers more than three hundred pages of text, with two maps and three photographic plates, and is composed of the following sections: hydrography, orography, stratigraphy, tectonic, and additional chapters on lignite deposits, mineral springs, and landslides, to which last-named the formations of Umbria are particularly liable. The stratigraphical section comprises the successive formations from the Upper Trias (Rhætian) as the oldest Umbrian Mesozoic series, to Lias, Jura, and Cretaceous, and to the Tertiary and Quaternary. The orographic and tectonic sections describe consecutively the anticlinal, longitudinally aligned, parallel Umbrian mountain and hill ranges between the mainly Tertiary Apennines and the predominantly Mesozoic Subapennines, with the synclinal depressions and valleys between them. These are the effect of earth movements during the Miocene uprise and erosion, the tropical, marine, and lacustrine Pliocene subsidence, and the Pleistocene and more recent Quaternary uprise, which lifted the marine, estuarine, and fluvial gravels and conglomerates to heights of 300 to 1000 metres above the present sea-level. These phenomena correspond to those in the same periods in the Alps, where the Pleistocene was a period of glaciation.

The outstanding physiographic feature of Umbria is the great central Tiber basin, which in its middle or Umbrian course of eighty miles extends north to south from Città di Castello to the plain below Perugia and Assisi and thence to Todi, with the subsidiary basin of Foligno and Spoleto, and the ancient, now separated basin of Terni, the principal feeders of which are the rivers Nera and Velino. On the subject of these great ancient Umbrian, as well as the Arno basins of Tuscany, the present writer published in the *Scottish Geographical Magazine* for May and June 1919 a paper, "The Ancient Sea and Lake Basins of Central Italy," and Dr. Lotti's work deals with the Umbrian basins on similar lines.

Another outstanding feature of Umbrian hydrography are the famous Terni Marble Falls at the junction of the Velino with the Nera just above that city, the height of the vertical column—the greatest of any waterfall in Italy south of the Alps—being 160 metres and its width 20 metres. The mean volume of the Velino, of 50 cubic metres per second, is capable of producing potential energy of 80,000 horse-power, largely utilised for hydro-electric purposes. Of these historic falls Dr. Lotti's work gives a beautiful photographic view, taken by Alinari of Florence, and here reproduced (Fig. 1). The falls, which were described in the present writer's paper quoted above, are formed by three cascades, the principal upper and the two lower ones, as shown in the illustration. The large volume of the Velino is derived, besides its own drainage area in the Sybelline Mountains, from its four affluents rising in the Sabine Hills. The Marble Falls owe their name to the thick crust of travertine which covers the underlying Jurassic limestone rocks and has the appearance of polished marble.

FIG. 1.—The Terni Marble Falls, Umbria.

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[1] Descrizione geologica dell' Umbria. Per B. Lotti. Pubblicata per cura del R. Ufficio Geologico. (Memorie descrittive della Carta Geologica d' Italia, Vol. 21.) Pp. 320. (Roma: Provveditore generale dello Stato Libreria, 1926.) 45 lire.

Palæolithic Man in Scotland.

UNTIL the summer of 1926 no indubitable trace of palæolithic man had been found in Scotland, if the Azilian remains of the west coast and the Tardenoisian flints scattered throughout the country be regarded as belonging to an intermediate period between the old and new stone ages. The persistent absence of palæolithic evidences has generally been ascribed either to the presence of an ice-sheet covering Scotland at a date long after such Arctic conditions had disappeared in England and Wales and to the consequent non-presence of human beings, or to the erasure of traces of palæolithic humanity deposited in a period of interglacial mildness by a later recrudescence of the ice-sheet.

During three summer months of 1926, excavations, superintended by Mr. James E. Cree, were carried out, by means of a generous grant from the Royal Society of London, in undisturbed caves in the valley of Allt nan Uamh, near Inchnadamph in Sutherland, in close proximity to the 'Bone Cave' which yielded such