dense forest of the lodge pole, or Murray pine (*Pinus murrayana*), more or less mixed with Douglas spruce (*Pseudotsuga taxifolia*), white fir (*Abies concolor*) and white pine (*Pinus monticola*). This belt is invaded by the hemlock (*Tsuga pattoniana*), and red-bark fir (*Abies nobilis*) of the zone above. At about 6,200 feet the trees of the middle or Canadian Zone fail, except on the warmer exposures, and one enters the superb forest of the Hudsonian or upper zone, a forest of splendid firs (*Abies nobilis*), and sombre hemlocks (*Tsuga pattoniana*), sparingly mixed with the sub-alpine fir (*Abies lasiocarpa*) and white-bark pine (*Pinus albicaulis*). The monstrous cones of the red-bark fir, with their bright red seed wings and exserted bracts, are among the wonders of the vegetable kingdom; while the dark hemlocks, with their drooping branches draped in the long hanging beards of a blackish lichen, rank among the giants, some of their trunks measuring 17½ feet around.

The Columbia black-tail deer (*Cariacus columbianus*) is common on the mountains and furnished our camp with fresh meat. Large trout abound in Klamath Lake, at the south foot of the Mountain, and afford excellent fishing. Klamath Lake is also the resort of thousands of ducks and other waterfowl. Hence the sportsman, as well as the tourist, naturalist, and lover of the grand and beautiful in Nature, is sure to find the Crater Lake region a place of unusual interest. For scenic beauty and grandeur Crater Lake, with its deep blue waters walled in by towering cliffs and rugged crags, ranks among the gems of American scenery. C. H. M.

CURRENT NOTES ON PHYSIOGRAPHY.

DRUMLINS IN SWITZERLAND.

Dr. J. Früh, of Zurich, gives an account of '*Die Drumlins Landschaft*' — following by over twenty years Desor's *Paysage moraine* — with especial reference to the Alpine foreland (Jahresber. St. Gall. naturwis. Gesellsch., 1896). After a serviceable review of the distribution and description of drumlins in other countries, especially Ireland and the United States, the author describes in detail a number of localities, from Lake Constance to the Reuss. Not until 1893 were drumlins recognized in the Alpine foreland; Sieger then describing a group of them on the peninsula between the two arms of Lake Constance (Richthofen-Festschrift). It now appears that the Piedmont area overspread by the Rhine glacier in the latest glacial epoch contains a large number of radially arranged drumlins, whose attitude confirms the divergent direction of ice movement indicated by the dispersal of certain peculiar boulders in a district where striæ are almost wanting. The broad spreading of the glacier on the Piedmont area is shown by the deflection of the drumlins on the extreme right and left of Lake Constance, about 80° from the axis of the lake. The finest drumlin landscape of Switzerland is said to be a little south Pfäffikon, northeast of Lake Zurich, in the district of the Limmat glacier. Früh advocates the subglacial origin of drumlins, comparing them to sandbanks in rivers, as have other authors, but recognizing that some difficulties attend this explanation. In certain localities, the drumlins appear to be formed of overriden moraines.

TOPOGRAPHY OF SOUTHERN TUNIS.

Capt. E. de Larminat, of the geographical service of the French army, makes an interesting study of topographic forms in southern Tunis (Ann. de Géogr., v., 1896, 386–406). The initial form of the region appears to have been an extensive anticlinal dome; but this is now broadly unroofed. A ridge with an infacing escarpment, maintained on a resistant stratum, encloses an inner lowland, eroded on

weaker internal strata. On the northeast the enclosing ridge is nearly lost; but on the southwest it constitutes a well defined semi-circular divide. Larminat describes with much detail the various elements of form thus developed. Outliers (témoins) in front of the escarpment are figured in various stages of breaking down under the cross-examination of the weather. Streams that once drained outward, down the dip of the dome, have been 'confiscated' by the headwater growth of the inner lowland streams. A good figure is given of a dry stream bed (oued=wady) on the outer slope of the enclosing ridge, that maintains a considerable breadth up to the present divide, thus plainly witnessing a transfer of great drainage area from consequent to obsequent streams.

The generality of these phenomena is not referred to by the author. The unroofed dome of the Weald, in southeast England, repeats nearly all of them, even to the broad beheaded valleys that notch the encircling ridge; the few unlikenesses of two regions depending more on the surface expression as determined by climate than on differences in structure or in stage of development. The region of the Swabian Alps, dividing the drainage areas of the Rhine and the Danube, exhibits escarpments, benches, outliers and shifting divides in remarkable perfection. One of the greatest examples of the kind is described by Dutton under the name of the 'San Rafael Swell' in his report on the High Plateaus of Utah. Less notable examples can be given in great number.

GUAYRÁ CATARACTS OF THE PARANÁ.

COUNT P. ANTONELLI gives a spirited narrative of his excursion in August, 1895, to the Guayrá cataracts of the Upper Paraná in southern Brazil (Mem. Soc. geogr. ital., vi., 1896, 80–102). His route eastward from Rosario on the Paraguay led for days through the virgin forests, passing occasional settlements where *yerba mate*, or Paraguay tea, was cultivated; then by canoe down the Yagatimi to the Paraná, just above the cataracts. Although visited by a number of travelers, accounts of the place vary greatly. Antonelli states that above the falls the river is expanded to a breadth of ten kilometers, flowing quietly among many islands; then it plunges suddenly down twenty-two channels over broken granite ledges, descending 25 or 30 meters into a gorge not more than 60 meters wide, through which all the waters are discharged in foaming rapids to the lower river. A route map by surveyor Mariotti and several views from photographs by San Martin are included. As is so often the case, personal narrative is prominently brought forward, technical geographical description is lightly touched, and physiographical relations do not seem to have been even dreamed of.

AUSTRALIAN EXPLORATION.

EXPLORATION in western interior Australia continues to reveal a great expanse of 'desert' having a varied topography, as summarized by several recent writers (Trans. Roy. Geog. Soc. Austr., Victorian branch, March, 1896). J. W. Jones outlines the geographical results of the Elder exploring expedition. J. A. Panton reviews 'Australia deserta.' A. J. Wright gives a narrative of his journey to Coolgardie, in the new gold field of western Australia. All tell of an arid region, broken by bare mountains of ancient rocks, attaining a height of three or four thousand feet; great intermediate areas of limestone and sandstone, much denuded, and holding salt lakes or dry lake beds in the depressions. Even when the surface of the basins is dry, salt water can usually be found a few feet below, 'so that the enterprising miner, with his condenser, can now depend upon the salt lake for a permanent water supply.' At the base of the imper-

vious old-rock ridges, the local accumulation of ground water is known as a 'soak.' Much of the sandy surface is occupied by *Triodia irritans*, known as spinifex, or needle grass; a gray-green, hard spiny bush, growing so dense in places as to impede travelling. Elsewhere there are patches and belts of herbage fit for pasture, and of dense scrub forests. Trains of camels with Afghan drivers are often seen on the way to the gold fields.

NOTES.

The voyage of the Norwegian whaling steamer Antarctic in the South Polar seas, 1894–95, already familiar from the narrative of Borchgrevinck, one of the seamen, is described by the captain, L. Kristensen, in the transactions referred to in the preceding paragraph.

The *Geological Magazine* (London) for March contains an account by Preller of the Merjelen lake, enclosed by the Aletsch glacier, in Switzerland, with an excellent photographic plate.

La topographie aix Etats Unis is the title of an appreciative article by Gen. de la Noë, director of the geographical service of the French army (Ann. de Géogr., v., 1896, 143–155). He gives particular attention to Gannett's Manual of Topographic Methods, with especial praise to the advice on 'sketching,' for which, curiously enough, even the French army engineers have no equivalent expression.

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CURRENT NOTES ON ANTHROPOLOGY.

QUESTIONARIES FOR ETHNOGRAPHICAL RESEARCH.

Various anthropological societies and governments have from time to time published series of queries to guide travellers who desire to study the people in the countries they visit. One was issued in 1889 by the French Société d' Anthropologie, prepared by the able hands of a committee consisting of MM. Hamy, Hovelacque, Vinson and Letourneau. It is needless to add that it is thorough and well digested. Moreover, it is brief, covering only sixteen pages, and yet the committee claim with general justice that no really important points are omitted.

The latest publication of the kind is the 'Instrucktion für ethnographische Beobachtungen und Sammlungen in Deutsch Ost-Afrika.' It is published in the 'Mittheilungen aus den Deutschen Schutzgebieten' (Band IX., 1896, Heft 2), and was prepared by Dr. Von Luschan. The instructions are arranged in a series of questions, 88 in number, and are accompanied by a separate sheet or sheets, to be filled out with somatologic observations. The separata, which are intended for distribution, are interleaved, and contain a number of blank pages at the end for notes and are firmly sewed in linen covers. These minor precautions aid materially in the practical utility of such a publication.

THE TEACHING OF ETHNOLOGY.

In the 'Bastian Festschrift,' Dr. Ernst Grosse has a timely article on the teaching of ethnology in high schools and universities. It is to be regretted that he contrasts ethnology with anthropology, instead of making it a branch of that general science, which it properly is. However, he appreciates what ethnology is in itself, defining it as 'The science of the culture of peoples.' He also assigns it its just position, speaking of it as a 'science destined to open a new era in the whole history of civilization.'

Entertaining these views, he cannot understand why it is so neglected in institutions of education, but inclines to attribute this to its somewhat revolutionary character, and to the limited opportunities it at present offers for pecuniarily profitable