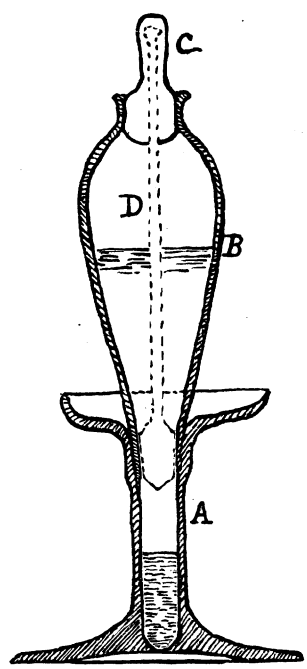
paratus is more or less cumbersome and fragile on account of the stop-cocks it contains.

It appears to me that the separating tube proposed by Smeeth (Proceedings of the Royal Dublin Society, May, 1888, p. 58) has not been fully appreciated. The principle involved seems to be an excellent one, and by modifying the shape somewhat it can be much improved. With this end in view, several of the tubes were made by Eimer & Amend, of New York, after the design indicated in the accompanying figure. The apparatus consists of a cup-shaped base, A, with a hollow standard,



the tube B, to contain the heavy liquid in which the separation takes place, the stoppers C and D to close respectively the upper and lower ends of this tube. All of these separate parts have ground fittings, so as to be water-tight. The tube is so simple that no special explanation of the method of using it is needed. It will be seen that when the two stoppers, C and D, are out, it affords an opportunity to stir both the material which has sunk to the bottom of the tube of the standard A, as well as that which floats upon the top of the heavy liquid in B, and by repeating the process several times it is possible to easily secure a complete separation.

It will be readily seen, also, that by inserting the stopper D, the tube B, with its contents of heavy liquid and light material floating on its top, can be removed. The heavy material can then be washed out of A, leaving this heavy material entirely separated in the standard A.

This apparatus, besides the advantage already enumerated, is especially stable and portable, and all the material during the separation is free from exposure to the air, features which give its great advantage in laboratory work.

J. S. Diller.
U. S. Geological Survey.

CURRENT NOTES ON PHYSIOGRAPHY.

VALLEYS OF THE OZARK PLATEAU.

The account of the Ozark mountains recently published by Keyes (see Science, Feb. 21, 1896) is followed by a valuable essay from O. F. Hershey on the valleys of the same region (Amer. Geol., xvi, 1895, 338–357); the conclusions of the two observers agreeing in general as to processes of land sculpture, but differing somewhat as to geological dates at which various stages of the work of denudation were reached. A lowland peneplain has been uplifted to form the Ozark plateau; it is deeply dissected around the margin, so that the dissevered hills are not inappropriately called 'mountains.' The ancient lowland is called a Tertiary peneplain by Keyes, and a Jura-Cretaceous peneplain by Hershey. The latter describes certain broad and shallow valley-troughs, slightly depressed beneath the general upland, as the work of Tertiary time in the gently uplifted Cretaceous peneplain. He concludes that the meandering

courses of the narrow young Pleistocene valleys are inherited from similarly curved courses on the flat floors of the old Tertiary valley-troughs in which the young valleys are incised; while the relative straightness of the Missouri is ingeniously explained as a consequence of its comparatively recent entrance into this region, after uplift in the region of the great plains.

COASTAL DESERT OF PERU.

MAJOR A. F. SEARS describes the coastal desert of Peru in a recent Bulletin of the American Geographical Society (xxvii., 1895, 256–271). The desert belt has its greatest width near latitude 5° S., where it measures about 120 miles to its inner margin, 1,000 feet high along the base of the western Cordillera; thence narrowing southward but extending about 2,000 miles along the oblique part of the South American coast. The surface is barren, except along the few river courses; crescentic dunes, or *médanos*, frequently occur; the drifting sand produces a sighing sound, like that from a forest under the wind. From December to March winds set on shore and give some rain to the Cordillera (apparently 'subequatorial rains'); then the rivers flow again, after having withered in the dry season. A graphic description is given of the 'coming of the river' in the case of the Piura. In February or March, when it is expected, travelers from up the valley are anxiously asked about its advance. When it is near the town of Piura, parties go out to welcome it with music and fireworks, returning with its trickling advance over the dry sandy bed. Thousands greet its arrival at the city. Excellent cotton is produced in the valley, and the crop might be much extended by systematic irrigation; but most of the water in the rising river is allowed to waste itself in the sea. Once in from five to seven years rain falls on the plain; then it is soon covered with grass and flowers, and cattle wander out of the valleys for a time; but in a few weeks all is barren again.

LAKES IN THE SAHARA NEAR TIMBUKTU.

THE great northward curve of the Niger carries its fertile flood plain into the border of the Sahara, where Timbuktu stands near the margin of the upland in a region of sand dunes alternating with stunted forests. The wet season comes with the equatorial rains from June to August; but high water in the river is delayed until January, as if determined by rains about the more southern head branches. The river then overflows its broad flood plain, above which the villages stand on sand dunes. French occupation has brought to light several lakes that occupy depressions between spurs of the desert upland, which rises in abrupt rocky slopes a hundred meters above their waters. The largest, Faguibine, is about 60 kilometers north of the river and west of Timbuktu; it is 110 kilometers in length and over 30 meters deep; almost comparable, therefore, with Lake Chad. It is fed by a flooded distributary of the Niger during high water; in the dry season a current sets back again from the lake to the river. Debo is a somewhat smaller lake, apparently lying on the flat flood plain of the great river, 120 kilometers southwest of Timbuktu (Bluszet, La région de Tombouctou, Bull. Soc. géogr. Paris, xvi., 1895, 375–388).

Unless gratuitously explained by local subsidence, Faguibene may perhaps be regarded as one of those lakes that stand in a lateral valley near its junction with a main valley along which a great river has been actively building up a heavy flood plain.

PHYSIOGRAPHY OF MONTENEGRO.

A RECENT supplement to *Petermann's Mitteilungen* consists of 'Beiträge zur physischen Geographie von Montenegro,' by K. Hassert, *privatdocent* in Leipzig, giving a very serviceable account of this rugged and

out-of-the-way country. Successive chapters treat the previous studies, geological structure, surface form, landscape, springs and rivers, lakes, climate and plants. Special attention is given to the karst district of limestone understructure and subterranean drainage; the peculiar topography thus controlled being so fully developed that a considerable series of special terms is required to name its various features. Although having a plentiful rainfall, the karst surface suggests aridity by reason of the scantiness of soil and the frequent exposure of bare rock; and the loose-lying limestone blocks have not been without influence on the course of local history in furnishing ammunition for the 'stone batteries' with which Montenegrins on the valley sides have harrassed the Turkish invaders in the defiles below. The uplands are frequently dissected by deep canyons, which greatly impede travel and trade; but the people have by long practice become expert in shouting across the chasms, thus sending both public and private messages.

Scutari lake, seldom over twenty feet deep, is explained as a limestone lowland, or *polje*, whose outward drainage is obstructed by the alluvial deposits of the river Drin.

As is often the case, the treatment of the different chapters is uneven. Careful discussion of origin is given to the forms of the limestone region; much less attention is given to such problems as the location of stream courses and the attitude of divides; an inward migration of the latter is strongly suggested by the short course of the Bojana system to the Adriatic and the long course of the Danube branches to the Black sea.

W. M. Davis.

Harvard University.

CURRENT NOTES ON METEOROLOGY.

INTERNATIONAL CLOUD STATIONS.

The following is a complete list of the stations which are now taking cloud observations with photogrammeters, and theodolites, in connection with the scheme to be followed throughout the International Cloud Year, which has been extended until August 1, 1897. Paris; Upsala; Potsdam; Braunschweig; Danzig; St. Petersburg; Nijni-Novgorod (in summer); Batavia, Manila, and Sydney, N. S. W. The following stations are taking observations with theodolites: Washington, D. C.; Blue Hill Observatory, Readville, Mass.; Bossekop (in summer); Dorpat; Tiflis; Ekatherinenburg; Irkutsk. There will probably also be a second station in Australia, one in India and one at Lisbon.

ILLUSTRATIONS OF CLOUD TYPES.

In connection with its work on clouds already referred to in Science, the Weather Bureau has issued a sheet giving illustrations of the typical cloud forms. The accompanying text contains descriptions of the clouds, and also data as to their mean heights and velocities. The sheet was prepared as an aid to observers in their cloud work. Most of the types selected are good, and the reproductions excellent as a whole. The alto-stratus and stratus are, however, unsatisfactory. The International Cloud Atlas, which has just been issued, gives us the cloud types selected by the International Cloud Committee, and these will, of course, now be the standard for the world.

THE ST. LOUIS, MO., TORNADO OF MAY 27.

With commendable promptness the Weather Bureau issued on May 29, a special *Storm Bulletin* (No. 4 of 1896), showing the weather conditions over the United States on May 26–28, in connection with which the severe tornado of May 27th occurred at St. Louis. The Chicago 8 A. M. forecast on May 27th predicted severe thunder storms for Illinois, Indiana and Missouri during the afternoon and night, and a special warning was sent out from Washington at 10:10 A. M.