tage in using the Thomson, even under the most favorable conditions, and under ordinary circumstances there is no comparison between them, the D'Arsonval type being absolutely unaffected by external magnetic disturbances. Moreover, a good Thomson costs at least $400, and an Ayrton-D'Arsonval only about $70.

Whether this form of galvanometer will be equally satisfactory when used for ballistic measurements does not, as yet, appear. There does not seem to be any reason why, with a good design and a containing tube of hard rubber instead of silver, it should not be perfectly satisfactory.

Several sets of improved portable testing instruments for measuring capacity and insulation of cables, etc., are worthy of attention. Full sets of the instruments of Lord Kelvin are also shown.

Another exhibit, which may well make an American feel proud of the work which is being done in this country, is the display of the Weston Instrument Company. True it is that Mr. Weston is an Englishman, but the perfection of the instruments is due, not only to Mr. Weston's ingenuity, but also, to a large extent, to American machine-shop practice. No other country can hope to compete with us until they learn to use the fine and accurate machine tools which fill the instrument shops here. The writer had the opportunity a short time ago of visiting some of the more celebrated European works for the making of electrical and physical instruments. There was not a universal grinder to be seen in them, and in only one was a modern milling machine to be found, and then but a single one. All the last touches were put on by hand, and the result may be seen in the instruments themselves, where every screw has to be marked, because no screw will fit accurately into any hole except the one it is made for, and no two parts of the same type of instrument are interchangeable. In Europe, all the fine work is done in the assembling, here the greater part is done before the instrument reaches the assembler's hands. Probably there is no instrument in the world whose mechanical make-up is so perfect as an ordinary Weston voltmeter. A number of new designs are shown, and the new laboratory standards are especially fine.

The long-looked-for manganin wire bridges have begun to appear, the smaller portable testing sets being now on exhibition. This manganin wire is, as the reader is probably aware, the invention of Mr. Weston, having been discovered by one of his assistants, Mr. John Kelly, while experimenting on that line. There are a number of varieties of this alloy, which is formed of different proportions of copper, nickel, and manganese. Some of these have a negative coefficient, others a slight positive one, and an intermediate class, no temperature coefficient at the ordinary temperatures of working. The researches of the German Government Standardizing Bureau have shown that the alloy is a permanent one, and that it is well adapted for use in standard resistances. It is understood that new bridges of the latest improved form, with four and five dials, are soon to be put on the market, made of this wire, and accurate to a small fraction of a per cent. Another new thing, soon to be put out, is the Weston cadmium standard cell. It is well known by those who have done work on solutions that the solubility of a number of the cadmium salts is the same at all temperatures within the ordinary range of working Also that there is a relation between the solubility and the voltage production of a solution. Mr. Weston has utilized this property of the cadmium salts to form a cell (of a similar nature to the ordinary Clark cell, but with cadmium substituted for the zinc and zinc salts), whose temperature coefficient is practically nil. It is claimed that considerable usage has shown that it is very reliable.

As regards the electrical fountains, there is little to be said of them in spite of the great secrecy in which they are wrapped by the officials in charge. The principle is the one generally used, i.e., the projection of a beam of light so as to strike the walls of the jets from the inside, and so be reflected up along the inside of the column of water. Some slight mechanical ingenuity has been exercised in the means of feeding the carbons of the electric arcs, otherwise there is little of interest in the mechanism itself. The display, however, is very pretty, and it may be worth while to give a hint as to the best means of seeing it, as follows:—

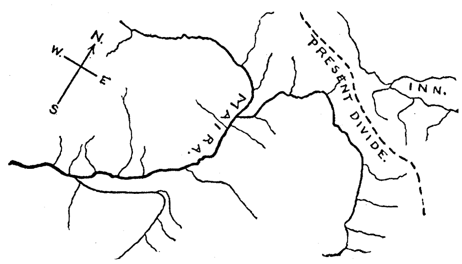
Take the electric launch at the wharf on the Liberal Arts side of the bridge connecting the Administration Building with the Liberal Arts Building, at about 8.30 or 8.15 in the evening (the exact time depending upon the time the electric fountains begin to play, the time of starting should be about 45 minutes before they begin). This will bring the launch back to the basin containing the fountains just about the time they are in full operation, and, as the boats make two turns round this lagoon, opportunity is afforded for a long view of the display. Moreover, the voyage around the other lagoons gives one a beautiful view of the grounds and buildings from the water. The illumination of buildings is well under way by that hour, and the long ride on the water is very enjoyable after the heat of the day. The writer has been informed by those who have had the opportunity of comparing the two, that even the most gorgeous sights of Venice do not enter into comparison with the view thus obtained. R. A. F.

A NEW INSTANCE OF STREAM CAPTURE.

BY HUNTER L. HARRIS, CAMBRIDGE, MASS.

The action of a rapidly flowing stream in cutting back into the drainage area of another, of less gradient, and, finally, capturing some of its headwaters, has been prettily described in the columns of this journal by Prof. W. M. Davis of Cambridge, under the name of "A River-Pirate." In this notice he describes an instance of such action occurring in eastern Pennsylvania, and alludes also to other instances, one of which is that occurring in the Upper Engadine of Switzerland.[1]

By keeping in mind the principles governing the cutting power of streams, we may easily picture to ourselves the conditions which would result from the excessive action of one stream over



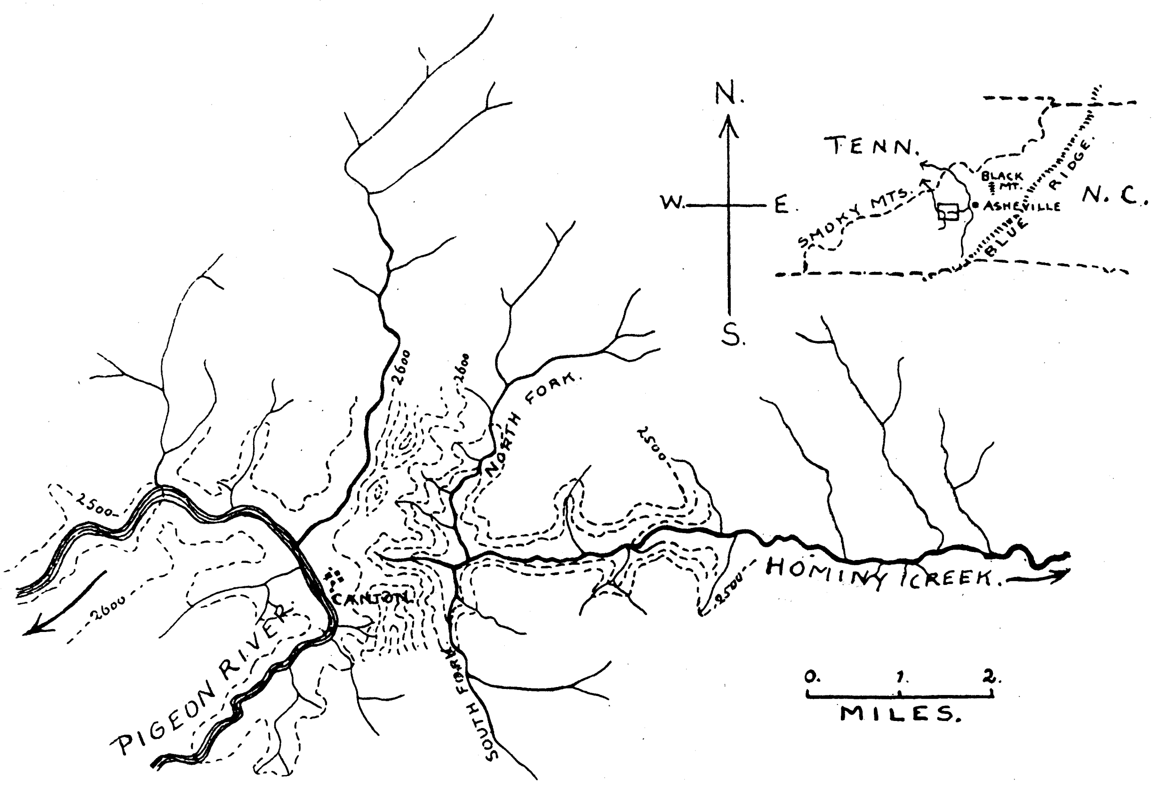
that of a near neighbor. Briefly, the more active stream, by virtue of its greater activity, would begin to enlarge its catchment basin, its headwaters eating their way gradually backward, and so pushing the divide farther and farther into the region formerly drained by the relatively weak stream. In process of time, the aggressive stream may actually tap some of its neighbor's headwater members, and, since the divide migrates unevenly, this tapping may occur either at the head, or at some point lower down on the invaded stream. If at the head, we may have a short inverted stream, which possesses few marks by which we may afterwards read its history. But if the connection takes place lower down, as is often the case, a peculiar back-set direction is given to the stolen tributaries which have been thus forced to discharge their waters through a new main stream of reverse direction. They may be compared to the barbs upon an arrow, the body of the arrow representing the pirate stream. This then constitutes a peculiarity by which we may easily recognize instances of such capture. But other evidence should be sought, such as the former comparative activity of the two principal streams, indications of the former course of the stolen tributaries, etc.

The case of the Upper Engadine mentioned above may be taken as typical. Here the aggressor is the Maira, flowing southwest, and it has not only taken a goodly part of the drainage area of the Inn, which has an opposite direction of flow, but has also appropriated at least three of its tributaries. The Maira is considerably more rapid, and hence more active, than the other. The accompanying sketch, taken directly from one of the maps of the Swiss official topographic survey, shows the characteristic form of the resultant drainage system.

[1] Vol. xiii., 1889, p. 108. See also R. de C. Ward, "Another River-Pirate," vol. xix., 1891, p. 7.

An instance of stream capture possessing all the "ear marks" of the typical case, is found in the Appalachian region of western North Carolina and within a few miles of Asheville. Among the principal streams traversing this elevated plateau region, are the Pigeon River and the French Broad, which take their rise on the broad back of the Blue Ridge, and, flowing westward, make their way through deep gorges in the Unaka Mountains, whence they descend into the broad, deep valley of eastern Tennessee. At one point, a northward turn of the Pigeon brings it within a dozen miles of the French Broad. Here, within half a mile of the former, and at an appreciably lower level, Hominy Creek takes it rise, and maintains a rapid, torrential course eastward, joining the French Broad at Asheville. A low and narrow divide separates this young and active stream from the slower moving Pigeon. Reckoning from this low divide, the fall of the smaller stream, within the first three miles, is more than three hundred feet, while an equal distance on Pigeon River yields a difference of level of only a little more than one hundred feet.

Here then are conditions favoring the lengthening of one stream



with loss of territory by the other, and such has clearly taken place. The accompanying map is traced from the topographic map of the region made by the U. S. Geological Survey (Asheville sheet). It will be at once noticed that the branching headwater tributaries of Hominy Creek, instead of flowing with an easterly course like those which enter lower down, have a distinctly back-set position like the barbs of an arrow. A visit to the region would leave little room for doubt that these were once tributary to Pigeon River. The arrangement of the contours shows, in fact, a depression which may mark their former course over what now constitutes the divide.

INSECTIVOROUS PLANTS OF SOUTH FLORIDA.

BY G. W. WEBSTER, LAKE HELEN, FLA.

As one approaches the moist grounds bordering on the lakes and ponds so numerous in south Florida, a beautiful plant is often found that, while it attracts the attention of the ordinary observor, is especially interesting to the student of natural history.

Its 10 to 25 leaves of a reddish color and semi-transparent texture are all radical, forming a tuft or rosette generally not more than two or three inches in diameter, from the centre of which during the months of April and May it sends up a single flower stalk or scape 6 to 10 inches high, and bearing at its summit a one-sided raceme of light rose-colored flowers 4 to 5 twelfths of an inch in diameter. Its oval seeds, when seen through a microscope, are finely furrowed and covered with small granules arranged with perfect regularity.

The spatulate leaves are narrowed into a long leafstalk or petiole, the wide portion less than one-half inch in length and one-half as wide.

It is known to botanists as *Drosera capillaris*, and has the usual characteristics of the order Droseraceæ.

The leaves are circinate in the bud, that is, rolled up from the apex towards the base, after the manner of ferns. The upper surface is covered with somewhat fleshy, reddish filaments less than one millimetre in length in the centre of the leaf and gradually increasing to the length of 4 or 5 millimetres on the border. These filaments or tentacles are about 200 in number on each leaf, and each bears at its summit a gland which secretes a drop of perfectly transparent, viscid substance that glitters in the sunlight like a brilliant dewdrop, hence the common name of sundew.

This secretion is very adhesive, and whenever any small insect attracted by the brilliant color of the plant, the prospect of a sip of dew or from any other cause, alights upon the plant, it immediately becomes entangled in the treacherous substance. The tentacles of the outer border of the leaf, which were before curved backward, now slowly but surely begin to curve inward, carrying the victim toward the centre of the leaf, and enfolding it closely from every side. At the same time the secretion from the glands is greatly increased, drowning or smothering the insect. The leaf also slowly assumes a more cup-like shape and rolls back from the apex toward the centre of the plant and finally holds its victim in a close embrace, with the 200 glands pressed down upon it, bathing it in their secretion, which has now changed to acid and become capable of dissolving and digesting the soluble parts. These are taken into the circulation