and the rooming houses for students. The selection of the more distant site will mean a loss to the interests mentioned.

THE Navy Department has announced the publication of the new hydrographic chart of Cuba, marking the completion of a twenty-five-year naval survey which has made available accurate information of Cuban waters for the benefit of merchant ships and naval vessels. To obtain the data for this work, 2,300 miles of shore line have been surveyed and 23,429 square nautical miles of soundings have been made. During this field work one general chart, twenty-one coastal charts and fifty-six harbor or plan charts have been evolved, all of them hydrographically and geodetically accurate. While the work progressed 634 editions of the various charts have been produced, incorporating changes and additions as the data became available from the field parties. With the exception of the years 1917 to 1921, the Navy has had one and, part of the time, two naval survey vessels engaged in this work during the season when it could be expeditiously employed. During the last few years, since the development of aviation and with the assistance of aerial photography, much more topographic detail was obtained. Mangrove-covered shores and cays which were almost inaccessible by boat were accurately charted. More than 1,265 miles of the main coast line of Cuba and the Isle de Pines have been flown, photographed and charted by naval planes.

AN account of variations in the standards of electrical resistance established by the British Association Electrical Standards Committee in 1865 was given by Sir Richard T. Glazebrook and Mr. L. Hartshorn in a paper read in the Mathematics Section at the York meeting. This traced the history of the variations known to have occurred in the standard coils and discussed the results up to date. The records, it was noted, showed that most of the coils had changed appreciably during their long life, but that two of the platinum coils of pure metal originally made in 1867 had remained unchanged. Between 1880 and 1888 the value of the British Association unit as expressed in terms of mercury remained unaltered. Down to 1908, allowing for recorded alterations in the coils, the value assumed for the British Association unit was satisfactorily known. The point of most importance which emerged from Sir Frank Smith's measurements in that year was the permanence of the platinum coils. This had continued, and according to Mr. Hartshorn's observations in 1932 the values observed for the minute difference between them had lain between 0.00059 and 0.00063 British Association units.

DISCUSSION

THE SHOVELNOSED STURGEON IN THE ARKANSAS RIVER

ON November 20, 1931, I visited Mr. J. R. Alexander on his plantation near Scott, Arkansas, about 20 miles below Little Rock, and about two miles from the Arkansas River. While there, Mr. Bruce Crump presented me with some fragments of fish armor of a very unusual kind, but evidently from a sturgeon. The fisherman, Mr. T. C. Hamilton, who had caught it, said that the fish was called a "sand sturgeon." Later, Mr. Crump obtained from the same fisherman and sent me the head and major part of the skin of such a fish (the tail part only being lacking). This fragment of armor had suffered much from exposure to wind and weather, but still there was no doubt that it came from a *Scaphirhynchus,* a sand sturgeon.

Later still, the same fisherman caught in the Arkansas River a specimen of the fish about two feet long. This Mr. Crump opened up, removed viscera and flesh, cured in salt, dried and sent to me by mail. It reached me in perfect condition, save that the tip of the upper lobe of the caudal was broken off. A glance at this splendid specimen showed beyond doubt that it was a shovelnosed sturgeon, a *Scaphirhynchus* and presumably a *platorhynchus.* But considerable study was necessary before it could be definitely said what form it is. This was because a closely allied form, *Parascaphirhynchus albus,* has been taken in the Mississippi River at Alton and Grafton, Illinois, and later at various points up the Mississippi River to Keokuk, Iowa. Compared with the better-known common shovelnose, this form is rare.

These two fish are differentiated mainly on many small unlikenesses, not very apparent unless they are before the student. These fine points can not be made out very well on a dried specimen, but there are enough major differences to enable me to say that these fish taken from the Arkansas River belong to the genus and species *Scaphirhynchus platorhynchus.* The common names given to it in various parts of the Mississippi Valley are the sand sturgeon, shovelnosed sturgeon, switchtail or hackleback.

Now comes the question as to whether this fish has ever before been taken in the Arkansas River, and further whether or not it has ever been recorded from any of the other rivers of the state.

Diligent search has been made through all the articles listing or describing fishes collected in Arkansas, and once only do I find it listed. However, so long ago as 1857 there was published "Reports of Explorations and Surveys . . . for a Railroad from the Mississippi River to the Pacific Ocean, Made . . .

1853–6," Vol. X, Zoology, containing "Fishes" by Charles Girard. On page 357 a young specimen is listed as collected by Dr. George C. Shumard near the mouth of the Poteau River in 1853. Elsewhere (p. 59 of special report No. 5) this fish is stated to have come from the Missouri River. Presuming that the first statement is correct, the atlas shows that the Poteau River rises in the western part of Arkansas, flows in a great circle west, north and northeast and empties into the Arkansas near to but west of Fort Smith, Arkansas. The specimen then was taken in what was at that time the Indian Territory, and is now Oklahoma. It then belongs in the Arkansas River drainage but was not collected within the state of that name.

The next reference is brief but definite. D. S. Jordan and C. H. Gilbert collected a specimen (no data given) in September, 1884, from the Red River at Fulton, Arkansas.[1] It is unfortunate that they confine themselves to merely listing the fish among those caught. Little more information is given by S. E. Meek,[2] who lists the fish on the authority of Girard, and of Jordan and Gilbert, but gives its habitat as "Mississippi Valley." There is no evidence whatever that he had ever collected the fish from Arkansan waters.

It is significant that in the 38 years since Meek wrote, the fish has never been recorded from the waters of Arkansas. From this one must judge that it is a rare fish. During a residence at Little Rock from 1895–1901, and in numerous visits there since I have never heard of it, although my interests in certain of its kindred fishes have led to much quest for information about these fishes.

Ganoid Fishes in Arkansas

In conclusion it is interesting to note that this short article makes a definite record for Arkansas of another member of the old group Ganoidei. Of these archaic fishes the following are known from Arkansan waters:

(1) *Scaphirhynchus platorhynchus*, the sand or shovel-nosed sturgeon;
(2) *Polyodon spathula*, the paddlefish or spoon-billed sturgeon;
(3) *Lepisosteus osseus*, the billfish or long-nosed gar;
(4) *Lepisosteus platostomus*, the short-nosed gar;
(5) *Lepisosteus spatula*, the alligator or broad-nosed gar;
(6) *Amia calva*, the grindle, bowfin or lawyer.

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[1] Proc. U. S. Nat. Mus. for 1886, 1887, Vol. 9, p. 14.
[2] A Catalogue of the Fishes of Arkansas. Ann. Rept. Geol. Survey, Ark. for 1891, Little Rock, 1894, Vol. II, Misc. Repts., p. 227.

DETERMINATION OF THE RELATIVE VOLUMES OF TWO COMBINING STREAMS FROM THEIR TEMPERATURES

From the law of heat transfer we know that if two volumes of water, V_1 and V_2, having temperatures of T_1 and T_2, are added together the combined volume will be $V_1 + V_2$ (called V_3), and their temperature T_3 will be given by the equation:

$$\frac{V_1T_1 + V_2T_2}{V_1 + V_2} = T_3$$

If two streams unite and their temperature and the temperature of the stream below the junction is taken, then their relative volumes in cubic units per unit time can be found by this same equation slightly simplified to fit the special situation.

Let A be one stream, B the other and C the stream resulting from the union of A and B. Also let V_1 be the volume in cubic units per unit time of A, V_2 of B and V_3 of C. T_1, T_2, T_3, are the temperatures of A, B and C, respectively.

$$1.\quad \frac{V_1T_1 + V_2T_2}{V_1 + V_2} = T_3$$

$$2.\quad V_1T_1 + V_2T_2 - V_1T_3 - V_2T_3 = 0$$

$$3.\quad V_1(T_1 - T_3) = V_2(T_3 - T_2)$$

$$4.\quad \frac{V_1}{V_2} = \frac{T_3 - T_2}{T_1 - T_3}$$

$$5.\quad \frac{A}{B} = \frac{T_3 - T_2}{T_1 - T_3}$$

The substitution of the temperatures of these streams in equation 4 will give the relative volumes per unit of time of these streams in any case except where the temperatures of both streams are the same, but that case is sufficiently rare so that the calculation of relative volume by temperature will save much time and labor on water surveys, etc.

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DERMATITIS PRODUCED BY ENCELIA CALIFORNICA NUTT

In a recent number of Science, Dr. Munz[1] has called attention to a new case of a plant causing dermatitis. Perhaps there are other offenders of this sort common in our flora that should also be investigated. I wish to call attention to one such plant, the *Encelia californica* Nutt (Compositae), which I am sure causes severe dermatitis on some individuals.

One of my sons, on returning home for short inter-

[1] Phillip A. Munz, "Dermatitis Produced by Phacelia (Hydrophyllaceae)," Science, 76: 194, August 26, 1932.