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.

E. W. Gudger
American Museum of Natural History

[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.

Ronald L. Ives
University of Colorado

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.