the case, there is more agreement than difference in our discussion.

My misapprehension arose as follows: In his essay of Jan 29, after speaking of headwater erosion and the subsequent capture or lateral abstraction of certain streams by this process, Professor Hicks wrote, "The latest robbery in the Loup system is that of the headwaters of the Wood River. Journeying down from the headwaters of the South Loup, one is impressed with the apparent continuity of its valley with that of Wood River, rather than with that of the South Loup itself below Callaway. It is obviously an instance of the lower, more easterly stream cutting through the divide and drawing to itself the headwaters of the higher one. This series of captures by lower tributaries is exhibited on a grand scale and in a mature form in the Loup system."

If the reader will refer to the first figure in Professor Hicks's essay, he may understand why I inferred from this sentence that the several other deflected streams, exhibiting the same relative parts as shown in the South Loup and Wood Rivers, constituted the "series of captures" in which the South Loup was "the latest robbery."

It now appears, however, that the head of Wood River was not precisely located in the figure referred to; and that its correction by Professor Hicks in his letter to me places it more as figured by Professor Todd in *Science* for March 11. As thus figured, it is distinctly placed in another category from the streams deflected eastward by flood-plaining.

Professor Hicks refers me to his article on "An Old Lake Bottom" in the second volume of the Bulletin of the Geological Society of America. Mention is there made of certain old valleys of Tertiary erosion, more or less obscured but not entirely concealed by lake sediments of later Tertiary deposition, by which the country is now covered. These old valleys are placed in the same category with the abandoned channel at the head of the Wood River, by which the South Loup is supposed once to have flowed to the Wood, as if headwater erosion by adjacent streams had in all these cases determined the abandonment of the old valleys. But it is still not clear why all these abandoned valleys must be regarded as having lost their former streams by lateral abstraction following headwater erosion. I perceive that the slopes indicated in Professor Hicks's figures are in the proper direction for such abstraction; but it is surprising to find that slopes of so moderate a measure of inclination suffice to give one stream an advantage over another, even to the points of abstraction of this kind. I shall be delighted if this is proved to be the case; for, if so, the process of abstraction and the accompanying rearrangement of divides may be regarded as of very extensive application. As ordinarily explained, the advantage that the capturing stream must possess is much greater than would be found in a region of horizontal and comparatively weak sediments, and of moderate inclination, such as Nebraska.

I shall therefore hope to have a fuller discussion of the problem from Professor Hicks, and an exclusion of other processes as well as a confirmation of the effective action of headwater erosion on so large a scale in producing these changes in Nebraska river courses.

The chief rearrangement of the Loup streams, as shown in Professor Hicks's diagram, being the product of down-stream deflection of the tributaries of a flood-plained river, I find in them a very satisfactory justification of a somewhat hazardous explanation offered in an essay on the Rivers and Valleys of Pennsylvania (Nat. Geogr. Mag., I., 1889, 241) for the down-stream deflection of certain tributaries of the Susquehanna in the central portion of the State. But in this case the flood-plain, by whose growth the tributaries were deflected, is a thing of the imagination. If it ever existed, it has been entirely worn away by the denudation following the later elevation of the region in Tertiary time; the deflected streams, maintaining their specialized courses after uplift, cut down their channel through the imagined flood-plain sediments, and thus became superimposed on the underlying strata, which they now deeply dissect and traverse in a highly inconsequent manner. Professor Todd's diagram gives further illustration of this kind of down-stream deflection of tributaries. All of the branches of the Platte are deflected before reaching the main stream; the Platte itself is turned down before joining the Missouri; so is the Niobrara.

In this connection I wish to suggest another cause besides the three mentioned by Professor Todd for the north-eastward turn of the Platte at Kearney; namely, the possible spontaneous deflection of the river from its previous more direct course, as, for example, along the Little Blue, by its own action in building up the plain over which it flowed. The rivers of the plains of India frequently change their courses in this fashion; the Hwang-ho devastates the plains of China for the same reason. May not the Platte have once had the same shifty habit? The Garonne, in south-western France, is a still more striking example of a spontaneous avoidance of its former course. Much of the waste borne out from the Pyrenees by the Garonne and its fellows now forms a flat, delta-like surface, of radial slope from the point where the larger rivers issue from the mountains; but, instead of pursuing a direct course northward, the Garonne turns sharply to the east at the foot of the mountains; while numerous small streams run down the slope of the radial alluvial deposit. Perhaps in the same way the Little Blue and the branches of the Big Blue Rivers may represent the old courses of the Platte, abandoned for a newer course of lower grade.

There are two other questions that I should like to ask of western observers. Is there generally perceptible a right-handed deflection of the rivers on the plains, as if in consequence of the earth's rotation? Can examples be given of the lateral abstraction of one stream by another on a slope of planation, after the fashion described by Gilbert in his report on the Henry Mountains some years ago?

W. M. DAVIS.

Cambridge, Mass., April 7.

The Persistency of Family Traits.

THERE are one or two points bearing on the subject at the head of this article that were not mentioned by either of the writers in the issue of March 18. The first is that the mother in placental mammals tends to assimilate in respect to blood to the father, as the blood of the mother passes through the young *in utero* and therefore the strain of blood derived from the father is shared by the young with the mother. A study of family history carried on for almost twenty-five years shows that there is generally a running to what are called "family types" among the youngest of a numerous family, and the type is that of the paternal family. It is too well known to need argument that the mother frequently acquires diseases belonging to the father indirectly through the child she is carrying. It is also well known that an old couple tend to assimilate in facial and bodily appearance, and the change, as shown by numerous instances, is generally in the female, as the above facts would call for. We can see that each child in a family finds the mother more and more impregnated with the blood of the paternal house, and it is not strange if the children favor the family that gives them the name.

The other fact is that the pregnant mother is more readily influenced by whims than in any other state. From classical times to the present it has been the aim of those about a woman in such a state to make life as pleasant as possible. While we may no onger surround her with beautiful statues and other paraphernalia of a Roman household, we recognize that her whims may fix the character as well as permanently mark the coming child. We drive a gravid mare in a light wagon that the foal may be amenable to discipline. As the generality of married people associate more with the family that carries the name, it follows that the mother is affected by sympathy or antipathy for that family, and both lead her to dwell on the features and forms of its members, so that the child runs a good chance of bearing either or both. Birth-marks do not exist in fiction only, and though the bloody horse-shoe of Redgauntlet may be lacking, there are other signs to show the horror or antipathy of a terrified or whimsical mother. In a love match, the face of the father is reproduced, or, as the French proverb says, "The love child resembles the father." A union, therefore, of the two conditions noted above will cause the children to favor the race that carries the name rather than to run toward the spinster side, even were there nothing like reversions

to the primitive type, and as family portraits show a uniformity that could not exist if the race obtained but its mathematical proportion of ancestral peculiarities. arguments based on the mathematics of the case avail little in the discussion.

EDWARD H. WILLIAMS, JUN.

Bethlehem, Penn., April 9.

BOOK-REVIEWS.

The Great Earthquake of Japan, 1891. By PROFESSOR JOHN MILNE, F.R.S., and PROFESSOR W. K. BURTON, C.E. With plates, by K. Ogawa. Yokohama, 1892.

IN these modern days when photography has assumed such an important part, not only in the artistic side of life, but in the work of scientific observation as well, it was inevitable that after any great natural occurrence like the Japanese earthquake of October, 1891, the camera should be employed to assist in preserving a correct record of its effects. Some of the pictures so taken have been reproduced in the European and American illustrated papers and have aided much in conveying to western readers an idea of the great destruction caused by this calamity; but none which the writer has seen can be compared to the beautiful series of pictures contained in the volume named above.

It is an oblong quarto, 29 cm. by 41 cm. in size, containing twenty-nine full-page heliotype copies of photographs and one map. All but three of the photographs were made by the authors for the Imperial University of Japan, and are copyrighted in its name. They are printed on a fine Japanese paper, which is itself a product of the very district shaken by the earthquake. The book is published by Lane Crawford & Co., Yokohama, but the press-work was done in Tokyo. It is prepared as a popular souvenir of the earthquake, and makes no attempt at any scientific discussion of the phenomena, the ten pages of introductory letter-press on earthquakes in general and the short explanation attached to each plate being mainly descriptive.

In nearly one-third of the plates the objects illustrated are the temporary shelters to which the inhabitants were driven. But in those which illustrate the ruined condition of the buildings and bridges, the excellent plates give such perfect details that many points of scientific interest can be seen and studied. This is especially true of the series of five views of the Nagara iron railroad bridge. This bridge consisted of five two hundred-foot spans of trussed girders, of which one span fell entire into the river's bed, carrying down with it one end of each of the adjoining spans, yet the pictures make plain that the girders themselves were so well put together that they are but little injured by their fall. Another view shows the approach to this bridge, where the embankment has entirely sunk away, leaving the rails and ties eighteen feet up in the air. At another place where the rails have been distorted into a serpentine form, the photograph shows three distinct horizontal flexures in which the rails are at least two feet out of their alignment. Other views again illustrate the crevasses, often several feet wide, by which the ground was riven, especially

CALENDAR OF SOCIETIES.

Philosophical Society, Washington.

April 9.—W. J. McGee, Illustrations of Isostatic Pressure; Bailey Willis, Illustrations of Appalachian Structure (with lantern views); Robert T. Hill, The Geologic Evolution of the Topography of Texas (with lantern views).

Geographical Club, Philadelphia.

April 6.—Henry Pettit, The Orient and the Occident.

Contemporary Club, Philadelphia.

April 12.—Frank Hamilton Cushing, Zuni Folk-Lore.

Oriental Club, Philadelphia.

April 14. — Rev. Dr. Marcus Tastion, Psalms 24th, 73d, and 90th; Talcott Williams, Note on Arab Geography.

Numismatic and Antiquarian Society, Philadelphia.

April 7. — Inman Horner, Lieutenant Gorger's Notes on Alaskan Indians. Exhibition Alaskan Objects.

Publications Received at Editor's Office.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS. Transactions, Vol. VII. New York, The Institute. 8°. 647 p.

DAVIES, CHARLES. New Elementary Algebra. Edited by J. H. Van Amringe. New York, American Book Co. 12°. 294 p. 90 cts.

FERREE, BARR. Christian Thought in Architecture. New York, from the Proceedings of the American Society of Church History. 8°, paper. 32 p.

KELLER, HELEN. Souvenir of the First Summer Meeting of the American Association to Promote the Teaching of Speech to the Deaf. 2nd ed. Washington, Volta Bureau. 4°, paper.

NATURAL SCIENCE. Vol I., No. 1., March, 1892. London and New York, Macmillan & Co. Monthly. 8°. 80 p.

NEWALL, JANE H. Outlines of Lessons in Botany. Part II.: Flower and Fruit. Boston, Ginn & Co. 12°. 396 p. Ill.

PARSONS, JAMES RUSSELL, JR. French Schools through American Eyes. Syracuse, C. W. Bardeen. 8° 136 p. $1.

PHILLIPS, MORRIS. Abroad and at Home. New York, Brentanos. 12°. 251 p.

SMITHSONIAN INSTITUTION. Annual Report of the Board of Regents to July, 1890. 8°. 842 p. Washington, Government.