

curious enumeration of historical facts occurring every 177 days, for the space is limited. Only, by the way, I note that Professor Thomas interprets phonetically *Xaman* as "north," the character that, in reality, designates *nohol* "south" (see the evidence adduced by me in "Zeitschrift für Ethnologie," XXIII., p. 104). His third sample of the use of his "letterglyph" *b* is one of those interesting hieroglyphs that change the so-called "prefix" according to the four cardinal points. Compare Figs. 47, 48 of the adjoined table, the former taken from Codex Dresden 29, 30^c, the latter from Codex Tro. 31, 30^d. These varying elements undoubtedly are indicating the names of colors, as each of the four cardinal points was distinguished by a special color. And the so-called letterglyph *b*, with all probability, has to be considered as expressing the element *Kan* "yellow" (see "Zeitschrift für Ethnologie," XXIII., p. 108, 109). The explanation Professor Thomas gives of the five dots, seen under certain hieroglyphs, as rendering the sound *ho* "five," will receive a curious illustration by the varied form these dots exhibit, for instance, in the Fig. 35^b, taken from the Dresden Codex. It does not appear, with all, that the samples of interpretation presented by Professor Thomas in his last paper are more satisfactory than those of his former one. It will be seen, indeed, that there is no reliance in the simple fact that, applying a certain key, the parts give apparently appropriate results. In a similar way there could be proved and has been proved that the Mexican and Peruvian languages are derived from Sanscrit, and that the descendants of the lost tribes of Israel survive in the Southern Sea. The right, Professor Thomas claims, to apply such a key has to be proved in the first place. I am awaiting if, in the paper he is preparing for publication by the Bureau of Ethnology, he will be able to do so.

DR. SELER.

Steglitz, Germany, Dec 18.

Irrigation Surveys.

I HAVE just had the pleasure of perusing your issue of the 16th, with its review of Irrigation Work by the General Government. Allow me, in returning my thanks for the comprehensive references made, to make some brief corrections:—

In the first place, then, the expenditures of the Geological Survey as to "irrigation" work, have been that of two appropriations—in all \$350,000. This is wholly outside of printing, which is paid for under other appropriations. The cost thereof will not be less than \$15,000. Besides these two direct sums of \$100,000 and \$250,000, with the printing of Part II. in Annual Reports 10 and 11, the Survey for work in the Arid Region, topographic and hydrographic, has had two more annual appropriations of not less than \$100,000 in all. The terms of the appropriations were designed unquestionably to continue indirectly irrigation work which Congress had declared should not be continued by the Geological Survey. Its irrigation work, then, has cost much nearer \$500,000 than it has \$235,000. Its results are two finely printed volumes—one of 123 pages and the other of 395. In the latter are 80 or 90 pages of matter previously printed—the larger part of it, indeed, having been twice printed by committees of the Senate and House. The reprint in Report Eleven is of Major Powell's testimony and argument before the House Select Committee on Irrigation, 51st Congress, which in substance and effect is the same that Director Powell made to the Senate Committee at the same session. So, in effect, it has cost nearly half a million dollars to publish 419 pages of "original" reports. There are no topographical maps of significance as yet issued.

Now, the Department of Agriculture, under its office of Artesian and Underflow Investigation, and of Irrigation Inquiry, received and expended between April 15, 1890, and May 1, 1892, just two years, the munificent sum of \$70,000. During that time it made and has reported on two engineering, geological, and economic examinations of the Great Plains region, between 97° and 105° of longitude, and two reports besides on Irrigation proper. It prepared and issued six volumes in all,—a report on Artesian Wells, and the three parts you have noticed of the closing report on Artesian and Underflow Waters, also Progress Irrigation Report for 1891, and the volume referred to as "miscellaneous" by the re-

view. As the work is in part only my own, though I edited all of it, I can justly challenge the value of it all in quality, as much as I may claim it exceeds the report in quantity, as compared with the Geological Survey. The three reports (six volumes or parts) embrace in all 1,694 pages, and some 58 valuable profiles, maps and geologic sections, besides more than 100 other special illustrations. The report (four parts) you reviewed has been printed to the number of but 1,733 copies for the use of Congress, and it has cost something less than \$4,000. The other reports cost in all about \$2,500—a total estimate of \$6,500. Since that publication, Congress has appropriated \$6,000 more for Irrigation Inquiry. How much of this has been used I do not know; some of it I am aware has been wasted and I make the remark adversely, as much as I regret to say anything except in approval of the Department of Agriculture.

The account stands then:—

A. Ten thousand copies (5,000 each volume under a general provision of law) of two reports, and some other reprinting by the U. S. Geological Survey, with a number of reservoir sites reserved on the public lands, most of which have been restored under later law by the Land Office to the Public Domain; the cost of all, at least, \$465,000.

B. Eight reports in all by the Office of Irrigation Inquiry, Department of Agriculture,—three of the Engineers, three of the Geologists, and the same number of the Agent in charge (myself)—in all seven parts or volumes, containing the matter in brief, already stated, all this, too, in cost has been less than \$80,000.

The Weather Service volume (chiefly Mr. Glassford's work) is above criticism and that of the U. S. Census Office in its "Irrigation Division" work is only an adjunct to the U. S. Geological Survey, unduly fostered by the Secretary of the Interior and the Superintendent of the Census to enable Director Powell to do that which the 51st Congress by withdrawal of a specific appropriation had forbidden him doing, viz., continue the work of irrigation survey and inquiry. The agent in charge was formerly an hydrographer in the Survey and was transferred to the Census. He has done better than it could have been anticipated he would from his first bulletins, but the work has cost far more than it is worth. That, too, from the value of the conditions and not the ability of the agent himself. Of course, it will be noticed most because it has the benefit of the expensive printing and publishing of the Census Office.

This whole irrigation inquiry has been characterized by a wasteful scramble to get in or on it. The State Department has published a volume thereon; the Treasury's Bureau of Statistics has dabbled therein in its volumes on "Internal Commerce"; the General Land Office has had its shy; the Weather Service is discussing "Earth Moisture," etc., and the Army Engineer Office got in a little one on Egypt. The Department of Agriculture only did what it was ordered and of late months not all of that.

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Member Am. So. of Irrigation Engrs.

Washington, Dec. 26.

Geographical Variation in Birds

In ornithology geography is the father of trinomial nomenclature. Climate is one great factor in variation, and topography has not a little to do with making the climate; but geography is unquestionably the cause of variable climate, else would the polar regions be tropical instead of frigid. Topography is at best local.

The variations of a species of birds, which make of it several sub-species, are due to its geographical distribution. These varying individuals do not take the name of "forms," as in entomology, but are set apart as true sub-species, each with a more or less well defined habitat of its own. But there is a serious difficulty in ascribing any sharp line of difference between the forms which intergrade on the outskirts of the geographical range, and a corresponding difficulty in ascribing any definite geographical limit. It is not seldom that individuals of one sub-species are found far within the range of another sub-species.