is evident that the Miami, Licking and Kentucky rivers were all very much larger streams than Old Limestone, and if we should assume that the section of the Ohio below Cincinnati flowed, in preglacial times, in its present direction, the symmetry which Professor Miller sees in the present arrangement would appear most asymmetric.

I feel sure that a careful field study of the topographic features within a radius of twenty miles from the city of Cincinnati will convince any one of the truthfulness of Mr. Fowke's deductions.

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PERMANENT SKIN DECORATION.

The July–December, 1900, issue of the *Journal of the Anthropological Institute* publishes an abstract (No. 117) of Mr. H. Ling Roth's article 'On Permanent Artificial Skin Marks, a Definition of Terms.' The author distinguishes four varieties, all collectively and rather loosely designated by travelers 'tattooing.'

I. The Tahitian punctured method—practiced also by sailors, soldiers, etc.—by which a design is pricked into the cuticle, leaving a smooth even surface of skin.

II. The Maori chiseled type, produced by an adz-like implement, in addition to the Tahitian pricker, and exhibiting when completed a fine pigmented groove.

III. The West African incised variety—usually, but not always, non-pigmented—wherein deeper and wider grooves are cut—*not tapped*—with a knife, bone or hardwood chisel.

IV. The raised scar ('cicatrice saillante') of Tasmanians, Australians, Central Africans, etc., resulting from the continued irritation of the original incision, the insertion of foreign matter and the over-production of reparative tissue lifting the design in welts.

Mr. Ling Roth considers it desirable that the Tahitian word 'tatu' be confined to the first-named process, the native designation 'moko' be recognized for the second; for the third and fourth respectively, the terms cicatrix and keloid are offered.

This classification, looking toward greater precision in the use of descriptive epithets, is avowedly based chiefly on the character of the implements used and the method of their employment. The author has, however, overlooked two types as well marked as any of those included, the Dayak and the Eskimo. The former make use of a wooden block upon which the desired pattern is figured in relief. It is transferred to the skin by percussion, the block being pounded with an iron bar. Regarded from the side of its probable descent, this method must be deemed a subvariety of II. Classed by the tool producing it, it forms a distinct variety.

The other and more important omission, the inductive or line tattooing of the Eskimo seems most nearly related to type I, the latter form indeed occurring side by side with it. In the central regions, according to Dr. Boas, a needle and thread covered with soot is passed under the skin, the point of the instrument also being rubbed with a mixture of the juice of *Fucus* and soot or gunpowder. ('Central Eskimo,' p. 561.) The two processes recur more or less intimately associated over the greater part of the Eskimo habitat. The writer of this note would suggest for this inductive variety (type V.) the use of the Central Eskimo word 'kakina' (pronounced kakeena)='tattoo marks,' a term derived from the verb 'kakiva'='pierces it,' as in sewing, so as to make the point appear again on the same side. (See Rink, 'Eskimo Tribes,' p. 117.)

The main objection to the differentiation of these two types (II. b and V.) is the difficulty of distinguishing between II. a and II. b, and between I. and V., when neither the operation nor the implement has been observed.

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MAGAZINE ENTOMOLOGY.

To the Editor of Science: Columns open for attack have surely room for defense—wherefore permit me to say to the critical Mr. Smith, of New Brunswick, that I fear he does not quite understand the article he criticises. The paper in *McClure's* for September is part of a book not meant in the least to be scientific, entomologic, or any other 'ologic, but simply to set down things seen, and heard, and done, by two

fairly intelligent young people, living next to the ground upon a plantation in middle Tennessee.

Now as to hellgramites—the name may not properly apply to the white grubs, or rather, grayish-white ones, which were the choicest of all bait. But local fishermen called them so, and accepted it as a matter of fact that they were larvæ of the dragon-fly. Since I was setting down things actually true of a certain limited scope, not discoursing, *ex cathedra*, upon entomology, I felt justified in putting down the local name—with no thought of *lèse majesté* against the hellgramite and his adherents. I thought if my work was to have the value of verity I must make it square with what I knew, rather than the word, the latest word, of science. I fancy if explorers—say Stanley or Baldwin—came out of strange places, recording that the popular beliefs there were consonant with the newest discoveries, their work would have less worth and gain less currency. However, that has nothing to do with this particular case. Explorers are fallible persons—almost as fallible as myself. The only infallibles are those aggrieved persons who are always trying their cases in the newspapers.

Wherefore it is with something of amazement that I read Mr. Smith's positive assertion: "Pithy stems are rarely used by locusts, if at all, and dying twigs are never attacked." Will he kindly tell me, if pithy stems are never used, what sort are? No twig or stalk within my knowledge is, in its early stages of growth, without pith. In woody plants, after the wood ripens the pith becomes a fine line, and as the twig develops into a bough, wellnigh invisible. But assuredly if there is a deciduous tree whose new growth is not, while new, pithy, I have never seen nor heard of it. And at the risk of seeming more than ever contumacious, I repeat that some locusts—Tennessee locusts—did choose dying twigs to lay their eggs in—I watched them do it through many a summer hour, in the big oak whose bough almost touched my upstairs window. The twigs were of new wood—the last spring's growth—but yellowing, and beginning to wither. I do not recall ever seeing a sound twig stung by the ovipositor. The locust, or rather the female locust, has two fine saws, lying either side the ovipositor. With these saws she scratches the bark before depositing the egg. As to Betty-bugs three inches long—they are facts, not fiction. A Mississippi reader has just written, promising to send me one of them next season. He adds the interesting information that when one of the big Bettys falls upside down, one can see upon its under side a number of parasites. Regarding the June bug's identity, that was a matter of countryside belief, backed with pretty good olfactory proof of the transformation. And certainly plenty of true June bugs, green above, all yellow underneath, mingled amicably enough in the flights and hummings of the tumble bugs, black and green.

Let me say further—of the magazine articles, and the whole book—that my aim was not to instruct, but to record a phase of life known to me at first hand. Mr. Smith and the gentlemen of his kidney who assume that whatever is outside their own experience is necessarily false, have, without intending it, done me a real service, by showing me that before the book appears I must so elaborate its *motif*, and make it so glaring, and obvious, that even a wayfaring man, almost an infallible one, if he reads at all, will be forced to read aright.

MARTHA MCCULLOCH-WILLIAMS.

Very little comment on the above is really necessary. If Mrs. Williams is giving records of superstitions and country beliefs she owes it to her readers, as well as herself, to make it perfectly clear that this is the case, and that they are not intended to be received as instruction or as statements of fact. I am unable to see the bearing of some of Mrs. Williams's references to Stanley, etc., but that I presume is due to my own obtuseness. So I did not dream that an oak twig could ever be called 'pithy.' If the explanation were not made by a lady I should call it quibbling. It is a real pleasure to me to realize that I have done Mrs. Williams a favor, and I hope it will inure to the benefit of the readers of her forthcoming book. It is of course adding another to my sins; but I cannot refrain from saying that no insect to which the name 'locust' was ever justly applied in any publication known to me, has 'two

ne saws, lying either side of the ovipositor.' Nor, if a cicada is referred to, does the description of the method of oviposition accord with the fact. Finally, it might be desirable for Mrs. Williams to get the real facts concerning honey bees, that the rate of her 'fair intelligence' in middle Tennessee be not fixed unjustly low.

J. B. S.

CURRENT NOTES ON PHYSIOGRAPHY.

THE HIGH PLAINS OF COLORADO, KANSAS AND TEXAS.

THE attractions of the diversified Cordilleran region have caused the relative neglect by the geologist and the geographer of the more monotonous area of the Great plains during the last thirty years of exploration. Following the recent increase of attention to this extensive area, we now have an admirably lucid report on 'The High Plains and their Utilization,' by W. D. Johnson (21st Ann. Rep. U. S. Geol. Surv., pt. IV., 1901, 601–768, many excellent plates and figures), giving description and explanation to a stretch of the highest and smoothest part of the Plains, from 150 to 200 miles east of the mountains, in Colorado, Kansas, Texas and New Mexico. The largest continuous area here included is that of the Staked plains, between the Canadian and Pecos rivers, but more attention is given to certain smaller areas, separated by successive west-east valleys and extending through Kansas and Colorado northward towards Platte River. The strata of the High plains are chiefly silts, irregularly interstratified with gravel and sand in linear arrangement, but in lines slightly divergent and crossing. Silt is the most abundant material, yet coarser deposits are so plentiful that the whole loose accumulation is sometimes referred to as the 'Tertiary gravel.' This extensive deposit, in some places 500 feet thick, is the product of aggradation by braided or laced streams, whose load of material from the mountains could not all be carried across the gentle slope of the Plains. Evidence of this origin is found not only in variable composition and irregular stratification, but also in the trains of well-rounded gravel, derived from the resistant rocks of the mountains, stretching forward with the slope of the Plains, and becoming finer textured eastward. The lacustrine origin of these strata, usually advocated heretofore, but discountenanced by Gilbert and Haworth, is considered by Johnson and again rejected on good grounds. The fluviatile deposits mantle an uneven surface of older rock, eroded by an ancestral drainage system. They originally formed a vast 'débris-apron' of numerous laterally confluent river fans of long radius, with continuous slope eastward from the mountain base. The region was then a fluviatile plain of great dimensions, similar to that which to-day stretches southward from the base of the Himalayas, in northern India, and similar to the extensive piedmont fluviatile plains of mountain waste that are so commonly and appropriately associated with great mountain ranges in one or another phase of their maturity. But the High plains are now trenched by the west-east valleys worn by the successors of the streams that built the plains; this being the result of some change (preferably the increase of rainfall that accompanied the glacial period) whereby the capacity of the streams to erode was restored. Moreover, the fluviatile mantle has been worn away along two north and south belts. One is the arid belt near the mountain base, where vegetation is so scanty that the small rainfall has sufficed to wear away much of the river-made strata in the excavation of lateral valleys. The other belt begins 100 or 200 miles further east, where the rainfall is heavier and where the headward (westward) growth of many streams is pushing back a badland escarpment. Between these two degraded belts the tattered remnants of High-plains mantle are still smooth and uncut, because under their subhumid climate they have a close-knit cover of sod which has held fast under their light rainfall.

The dead-flat upland of the High plains is lightly pitted here and there by shallow circular depressions, up to 1,000 yards across. These hollows are not due to wind action, for however dusty the gales may be on the arid belt further west, the winds blow clear on the sodded plains. Some of the hollows are crater-like; many are encircled by cracks and rims of slightly settled grounds, and all except the small 'buffalo wallows' are regarded as sinks