the authorities of Trinity objected that instruction of this kind was already given by one of their lecturers.

Into the merits of a dispute on a question of organization of this kind it is difficult, and perhaps unnecessary, to enter. The main fact is that, even if Balliol and Trinity are right in claiming as against the University something like a monopoly of general lecture instruction in physics, they have enforced that claim by placing, for an indefinite period, the Oxford school of physics at a serious disadvantage. Not a penny of the grant asked for was to be expended on apparatus for elementary lectures. It was all required for a lodge, for expenses connected with Mr. Wilde's installation, and for an electrical laboratory such as other Universities have and the University of Oxford has not. The President of Trinity no doubt thought that he was striving to prevent the University incurring an unnecessary expense. Could not some of his scientific advisers have informed him that the questions as to whether an electrical laboratory should be built, and as to whether Prof. Clifton should spend the time which its erection would place at his disposal in delivering a particular course of lectures, are separate and distinct? Are there no Boards or Faculties in Oxford in which the arrangement of lectures can be discussed without the friends of progress obstructing progress in Convocation? Opposition to the extension of the Clarendon Laboratory (the necessity for which they did not deny), lest as a secondary result of that extension a course of lectures should be given, which would involve no cost to the University, but which they feared might infringe their own real or supposed rights, is not an attitude for which the combined Colleges can expect much sympathy.

The second point which was raised by the President of Trinity was dealt with in an equally unsatisfactory manner. In 1885, Trinity College built and opened the Millard Laboratory for instruction in theoretical and practical mechanics and engineering. The Laboratory contains a steam-engine and three dynamos. It is about to be further extended, and it is claimed that it contains all the apparatus required for technical work in electricity. The President recited these facts in his pamphlet, and then added: "But with the question of advanced work I must leave others, who have more knowledge, to deal."

We venture to think that before describing the Millard Laboratory in detail in a pamphlet opposed to the Clarendon Laboratory grant, it would have been well for the President to have obtained from experts such information as would have enabled him to make up his mind as to what the two laboratories had or had not in common.

If it is really intended to concentrate the teaching of electricity in Balliol and Trinity, and, while placing it in the hands of College lecturers, to prevent the University Professor of Physics from acquiring the facilities for teaching it properly himself, we can only say that a most mistaken policy has been adopted. Physics, on account of the cost of the apparatus required, is a subject in which centralization is desirable, and, considering the place which electricity now occupies among the physical sciences, it would be absurd to exclude it from the University Laboratory, and from the curriculum of the only teacher of physics whom the University herself appoints. To do them justice, the combined Colleges did not directly make any such proposal; but, if they did not mean to make it, why was the Millard Laboratory imported into the controversy? As far as we can judge from the description given of it by the President of Trinity, it is a technical laboratory which may develop into something analogous to that of Prof. Stuart at Cambridge. If so, it does not—and those connected with it ought to have known that it does not—occupy the gap which the new building was to fill. "Theoretical and practical mechanics and engineering," coupled with electrical technology, afford plenty of scope for the energies even of such active Colleges as Balliol and Trinity. It is a pity that, with all this zeal, they have yet to learn that pure science is an ally and not a rival, that a dynamo is useful in a physical laboratory in which no technology is taught, and that the way for a young institution like the Millard Laboratory to earn respect is to do good work, and not to signalize its appearance on the field of labour by preventing others from doing it.

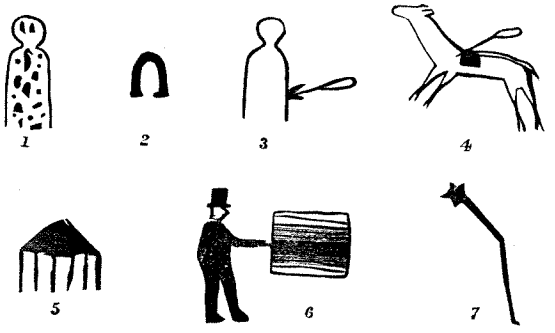
NORTH AMERICAN PICTOGRAPHS.[1]

THIS remarkable volume contains no fewer than 83 lithographed plates, and 209 separate woodcuts, and is an admirable compendium of the curious pictographs of the North American Indians. Large as it is, it professes to be only the forerunner of a still larger work that shall treat of pictographs generally. The author, Colonel Garrick Mallery, has already published an almost equally interesting memoir on "Gesture Language," in the first Annual Report of the Bureau of Ethnology.

One of the most striking features of the present work is the account it gives of the newly-discovered custom of the Sioux, or, more correctly speaking, of the Dakota Indians (for Sioux is some barbarism, repudiated by the natives), to keep national calendars. The custom is sufficiently ancient to have become generally established among this great branch of the Indians, but it is not old enough to have spread to the west of the Mississippi. One of the most important of the calendars begins with the year 1800; its historiographer was a man, still living in 1876, yclept "Lone-Dog." His calendar is painted on a buffalo hide, which appears to have been exhibited and explained to Indian audiences from time to time, and greatly admired by them, for four copies at least have been made from it (with variations of arrangement), and every intelligent adult Dakota knows its contents, and can read them in part. One of these copies is imitated in a beautiful plate, which is the most effective of all the many illustrations of this volume. The process of making the calendar is inferred to have been as follows:—During the dreary periods of their six winter months, certain elders of the tribe amused themselves with talking over the events of the past year, and Lone-Dog discussed with them which of those events should be selected by general suffrage as the representative of that period. Suppose it was an outbreak of the small-pox: then Lone-Dog drew the outline of Fig. 1 on one part of his buffalo robe, and dabbed it with red spots. Then that year became ever after known as the small-pox year, and the Dakotas would say so-and-so happened in the small-pox year, just as we should say in the year 1801. Or, again, the event might be that for the first time horses were seen by them that had been shod with iron: then the symbol of the year became a horse-shoe, Fig. 2. Lone-Dog's calendar is particularly graphic. Its earlier entries are probably derived from preceding chroniclers or from tradition; anyhow it covers the entire period from 1800 to 1871. The first entry is made in the middle of the robe, and the others are arranged year after year successively in an oblong spiral, the whole series being included in three turns and a half. They are drawn in black and red, the latter usually representing blood, of which plenty seems to be spilt in murder or in hunting. Thus Fig. 3 is a case of murder; Fig. 4 is a year in which a vast number of elk were killed, identified in the rude drawing by their cloven feet. Fig. 5 celebrates the erection of a trader's station; and Fig. 6 tells us that striped Spanish blankets were first introduced in that

[1] "Pictographs of the North American Indians." A Preliminary Paper by Garrick Mallery. Extract from the Fourth Annual Report of the Bureau of Ethnology. (Washington: Government Printing Office, 1886.)

year by a trader. Fig. 7 is the year of a great aërolite. Lone-Dog's system is not the only calendar. Others have recently been found by Dr. Corbussier which are drawn more elaborately, though not more intelligibly. The most important of these is only described, and not reproduced in this volume. It is by Battiste Good, and professes to date from prior to the year 1700. Being

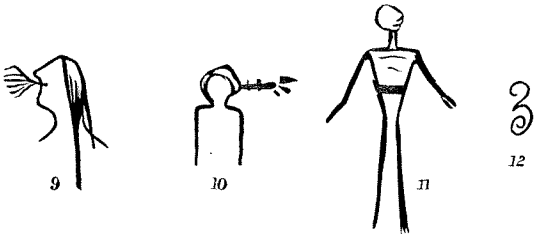


drawn in five colours, it would require much cost to imitate, and is withheld for the present.

Other curious features of the work are the pictorial censuses that it contains. One consists of eighty-four heads of families in the band of "Big-Road." Each is represented with the symbol expressive of his name attached to his head, after the manner of Fig. 8. Another

census is of the 289 adherents of Red-Cloud, who are for the most part portrayed on a similar principle.

Some of the more symbolic representations are amusing and instructive. Those for various diseases are as follow:—We have already seen the representation of small-pox, and that of measles is much the same. A whooping-cough year is typified by Figs. 9 and 10, in



different calendars, Fig. 10 showing the broken and explosive expiration with much effect. Craziness is expressed by a wavy line; thus the name of the chief in Fig. 8 being Crazy-Horse, the animal has wavy lines drawn on his body. Starvation is shown, in Fig. 11, by a thin belly, and a black line across it; and gripes are excellently expressed by a scroll, Fig. 12, something like a figure 3, only more twisted and tortured, scrawled over the abdomen.

The question is fully discussed whether this calendar-making was in any way due to the influence of the whites, but is decided on good grounds in the negative. The whole conception and the way of carrying it out seems to be thoroughly Indian, but it is not every Indian who is born with the historiographic capacities of Lone-Dog. The author testifies to the variety of individual aptitudes when speaking of the inhabitants of Queen Charlotte's Islands, who are beautifully tattooed. He says, "nor is it everyone who can tattoo. Certain ones, almost always men (let Mr. Romanes make a note of it), have a natural gift which enables them to excel in this kind of work."

The events that a group of persons are most apt to associate with an epoch during which they have lived together, are not necessarily the most important ones. They are those occurrences which are simple and well-defined, and have struck the fancy on that account, as well as from their unlikeness to former experiences. Such events are recalled with ease, and a partial or symbolic act of recollection suffices to identify them.

When pictorial nick-names are given to each successive year in council, as in the case of the Dakotas, the process must be very like that of giving verbal nick-names to new boys at school. This used to be a far more prevalent custom than it is now, and I have a vivid recollection of two old Etonians describing how it was done in their time. When the new boy made his appearance, he was of course well looked over and watched. Then, as the fancy took them, first one lad and then another addressed him with tentative nick-names. At the beginning, these trial names were apt to fall flat; at length one stuck; other lads adopted it, and usually in a few days the new boy was fitted with a generally-accepted name, by which he was afterwards known almost exclusively during the whole time he was at school. The appropriateness of the nick-name was by no means always obvious to strangers; it might even be due to some passing event with which by pure accident the boy was in some indirect way associated. I think this giving of nick-names is an excellent illustration of the manner in which many common words must have arisen.

The process of determining the most typical event of a year, and then of portraying it by a simple and bold design of a higher order of art than was known to Lone-Dog, and introducing no more detail than is necessary for identification, is well worth trying as an experiment. I tested it myself by attempting to construct such pictographs for the last few years of my life, under the condition that each should be included within a circle of the size of a shilling, and at last I succeeded fairly well, in my own, but probably too partial, judgment. I may add that, having done this, I laid a florin over my drawing, and traced a second circle round the florin. In the ring that lay between the two circles there was space for fully twenty-five bold capital letters, which I distributed among words that referred to other leading events of the year. The whole formed a by no means inartistic series of designs suitable for medallions.

I soon became so absorbed in my pictographs that I think others might interest themselves in the same way. It would be an amusing test of skill in a round game to try who could make the most artistic and vigorous design within the compass of a circle traced, say, round a half-penny—that is, of exactly one inch in diameter—to commemorate some recent event known to all. What a capital prize subject for art students it would be, to refer them to some brief register of events during the fifty years of Her Majesty's reign, and to ask for fifty such medallions, one for each year. Then, again, many persons carve in wood or paint on china, and want designs; let them take episodes in their own histories, and make friezes

that should illustrate the events in families, schools, houses, &c., such as the stained-glass windows in churches do those in the history of the Bible. How prettily girls might design pictographs to record notable events in a pleasant tour, and interchange them with their fellow-travellers as presents. Such designs as these could be made subjects of embroidery, or, if on a larger scale, of that brass *repoussé* work which is, or was, so much in fashion. It would be by no means difficult to convert them into actual medallions. First the wax model, then the plaster cast, then the cast in white fusible metal, then the covering with an electrotyped coating of silver, just in the way that the ancient coins are reproduced at the British Museum, at the cost of about three shillings each, which are now so frequently used in rows for necklaces. What a delightful memorial of twenty-five years of wedded history might be given by a husband to his wife, in the form of a necklace of such medals. It would be a pleasant labour to make a set of designs, which an artist could afterwards put into better forms, and construct from them the wax medallions for the electrotypist to cast and turn into metal. I commend this idea of commemorative pictographs and *glyptographs* (as works in relief ought to be called) to the notice of amateur artists, whether they work in pencil, ink, colour, carving, embroidery, *repoussé* work, china painting, or in modelling.

This volume is an excellent example of the growing variety and wealth of material now available to inquirers into the origin of language. We meet in it with abundant evidence of the rapidity with which pictographs become abbreviated into conventional symbols, and are thereby adapted to play the same important part in reasoning that is usually played by words. I cannot see that it makes any fundamental difference in the use of symbols whether they appeal to the ear or to the eye, though I fully grant that on many grounds, not worth entering into here, the former is more generally convenient, and best suits the idiosyncracies of the majority of persons. The unassisted sense of touch, as we have learnt from the case of Laura Bridgeman, may afford an adequate basis for the exercise of a considerable amount of reasoning. And for aught I can see to the contrary, a dog who "ponders," to use a dog-trainer's expression, may occasionally be carrying out some real act of thought by the aid of imagined and symbolic odours.

FRANCIS GALTON.

COCOA-NUT PEARLS.

THE following letter has been sent to us by Dr. Sydney J. Hickson :—

"During my recent travels in North Celebes I was frequently asked by the Dutch planters, and others, if I had ever seen a 'cocoa-nut stone.' These stones are said to be very rarely found (1 in 2000 or more) in the perisperm of the cocoa-nut, and when found are kept by the natives as a charm against disease and evil spirits. This story of the cocoa-nut stone was so constantly told me, and in every case without any variation in its details, that I made every effort before leaving to obtain some specimens, and eventually succeeded in obtaining two.

"One of these is nearly a perfect sphere, 14 mm. in diameter, and the other, rather smaller in size, is irregularly pear-shaped. In both specimens the surface is worn nearly smooth by friction. The spherical one I have had cut into two halves, but I can find no concentric or other markings on the polished cut surfaces.

"Dr. Kimmins has kindly submitted one half to a careful chemical analysis, and finds that it consists of pure carbonate of lime without any trace of other salts or vegetable tissue.

"I should be very glad if any of your readers could inform me if there are any of these stones in any of the Museums, or if there is any evidence beyond mere hearsay for their existence in the perisperm of the cocoa-nut."

On this letter Mr. Thiselton Dyer, to whom we sent it, has been good enough to make the following remarks :—

Dr. Hickson's account of the calcareous concretions occasionally found in the central hollow (filled with fluid—the so-called "milk") of the endosperm of the seed of the cocoa-nut is extremely interesting. It appears to me a phenomenon of the same order as tabasheer, to which I recently drew attention in this journal.

The circumstances of the occurrence of these stones or "pearls" are in many respects parallel to those which attend the formation of tabasheer. In both cases, mineral matter in palpable masses is withdrawn from solution in considerable volumes of fluid contained in tolerably large cavities in living plants—and in both instances they are Monocotyledons.

In the case of the cocoa-nut pearls the material is calcium carbonate, and this is well known to concrete in a peculiar manner from solutions in which organic matter is also present.

In my note on tabasheer I referred to the reported occurrence of mineral concretions in the wood of various tropical Dicotyledonous trees. Tabasheer is too well known to be pooh-poohed; but some of my scientific friends expressed a polite incredulity as to the other cases. I learn, however, from Prof. Judd, F.R.S., that he has obtained a specimen of apatite found in cutting up a mass of teak-wood. The occurrence of this mineral under these circumstances has long been recorded; but I have never had the good fortune to see a specimen.

Returning to cocoa-nut pearls, I send you a note which the *Tropical Agriculturist* for April last quotes from the *Straits Times*:—

"A trade journal appearing in Java gives the following particulars regarding a peculiar kind of pearl found in this part of the world:—It is well known that pearls have been met with within oysters and mussels. Sometimes even trees yield pearls. In the Proceedings of the Boston Society of Natural History, there is a paper by Mr. J. Bacon regarding the kind of pearls often found within cocoa-nuts. The specimens shown have been bought at Singapore. They are said to be so rare in the East Indies as to be highly prized by the native rajahs, and worn by them as precious stones. Mr. Bacon himself possessed a small pearl of this sort. It is said that when allowed to grow, they will reach the size of cherries. This pearl resembles the common variety in smoothness, whiteness, and scant lustre of surface. It is harder than it, and almost as hard as feldspar or opal. The common pearl varies in hardness, but is never harder than feldspar. The cocoa-nut pearl consists of carbonate of lime, with very few organic substances remaining after treatment with acid solutions. This organic matter is insoluble, shows no trace of vegetable substances after microscopical examination, and seems to be akin to albumen in structure. In the common pearl there is also found an albuminous substance, but the latter remains unchanged in appearance and lustre even after the calcareous constituent parts have been dissolved away. In other respects microscopical research has brought out the fact that the cocoa-nut pearl is formed of concentric layers without any nucleus. The whole mass is made up of layers of fine crystalline fibres. Prof. Bleekrode, in commenting on the former in a Dutch scientific periodical, says that Rumphius, the famous botanist, had in his 'Herbarium Amboinense,' given full particulars of this petrifaction in the cocoa-nut. Rumphius has even illustrated his account of it by accompanying drawings of the two forms in which this kind of pearl is met with—pear-shaped and round, either of uniform appearance or with red edges. Hardly one