south — on *Nyssa aquatica*. *Trypethelium sprengelii* Nyl. On various barks of trees, Key West to Jacksonville. *Opegrapha diapharoides* Nyl. On oaks from Jacksonville south. The great genus *Biatora* has many species. Of these *B. carneo-albens* Nyl. and *B. Floridensis* Nyl., found by me on *Carpinus*, are new, and of tropical derivation. Two other great genera, *Arthonia* and *Graphis*, teem with new species and rare forms. These find here their greatest expression, and the latter is reduced north of Florida to a very few species.

## CURRENT NOTES ON ANTHROPOLOGY.—XVI.

[*Edited by D. G. Brinton, M.D., LL.D.*]

### Linguistics as a Physical Science.

WHEN one surveys the works on linguistics which have appeared in the last few years, especially such as deal with the principles of changes in languages, it is easy to classify their writers into two groups, the one preferring to explain such changes by processes of mind, the other by purely physical conditions. This distinction goes back to that which would regard linguistics as a branch of natural history, and its laws no other than purely physical ones; or, on the other hand, that which claims the changes in language come chiefly through principles of psychology, logic, and metaphysics.

Some have aimed at a compromise by saying that linguistics is in its contents a mental science, but in its methods a natural science. Professor H. Schuchardt remarks, in a late number of the *Literaturblatt für Ger. und Roman. Philologie*, that it would be just as correct to reverse this statement, or to take the position that it is half a natural and half a historical science; provided that in the latter case we understand the two members of the proposition to be successive and not contradictory, the natural element passing into the historical. "Because," he concludes, with a remarkable expression of his position, "I believe in the unity of the science, and hold that there is no greater difference between biology and linguistics than between biology and chemistry."

### Gerland's Atlas of Ethnography.

I have had at hand all summer the "Atlas der Völkerkunde," by Dr. Georg Gerland, professor at the University of Strasburg (1 Vol., Gotha, Justus Perthes, 1892), and can speak of it now after that much use. It is composed of fifteen folio maps, and, as it is, I believe, the first complete ethnographic atlas ever published, it will not be out of place to give its contents. They are: I., Distribution of skin and hair; II., Density of population; III., Distribution of religions; IV., Distribution of diseases; V., Clothing, food, dwelling, and occupations; VI , Location of peoples in 1500 and 1880; VII., Europe in 1880; VIII., Asia in 1880; IX., South-east Asia; X., Oceanica; XI., Africa; XII,, Aboriginal America; XIII., America in 1880; XIV., Linguistic map; XV., Europe about 100–150 after Christ.

The first impression one has in examining the Atlas — and with me it is one that remains — is that entirely too much is attempted for a work of the size. The charts are necessarily on too small a scale and omit too much to be satisfactory for the special student; and what student is not special nowadays? The list of subjects above given will be enough to convince the reader that detail cannot be attempted in most of the charts. Turning to the map of the American aborigines, there is an evident lack of classification. For instance, what does "Peruvian peoples" mean? It is neither a linguistic nor physical group, and scarcely a political one. All tribes of Chili, Patagonia, the Pampas, and Tierra del Fuego are included under one rubric, and called "Chilians or Patagonians." Such classifications are worse than worthless, because they are misleading; and these by no means stand alone.

But it would be unfair to measure this atlas by its treatment of America, which, as usual in all works of the kind, suffers the most. In general, the Atlas is one of immense labor and of corresponding value. It ought to be in the library of every geographer and student of ethnography.

### To Deduce the Stature from the Measurements of the Long Bones.

This is a problem which has occupied anatomists considerably, without leading to as uniform conclusions as one could wish. There are important ethnic variations in the length of the long bones of both extremities, as is well known, and others run in families, or are peculiar to the individual. Scott says of Rob Roy, that standing straight he could tie his garter below the knee. Such a statement makes an osteologist wish for his bones! Long fore-arms are ethnically a sign of an inferior race. Hence all proportions must to some extent be modified by considerations of race.

A general formula has lately been advanced by M. Etienne Rollet, which seems to me, after comparing it with the measurements in Topinard, Schmidt, and others, the most convenient I have seen, and sufficiently accurate. The list of coefficients is stated as follows in the *Revue Scientifique* for August: —

| | Femur. | Tibia. | Fibula. | Humerus. | Radius. | Ulna. |
|---|---|---|---|---|---|---|
| Min. | 3.66 | 4.53 | 4.58 | 5.06 | 6.86 | 6.41 |
| Max. | 3.71 | 4 61 | 4.66 | 5.22 | 7.16 | 6.66 |

It is enough to multiply the length of the long bone named by the coefficient given above, to obtain the height; and by taking the average of a number of such measurements we reach a figure accurate enough for the height of either sex. I say accurate enough, because there is no use in being excessively precise on this question. It is well known that there is quite a difference in our stature when we rise in the morning, and when we go to bed after a hard-day's walk.

### The Birch-Tree as an Ethnic Landmark.

In a late number of the *Globus*, Dr. Krause of Kiel reviews the question of the origin of the Aryan nations as shown by the word for *birch*. The terms for birch and willow are the only two tree-names which are common, or practically so, to all tongues of the Indo-Germanic group. The ancestors of all must have come, therefore, from some locality where these trees were indigenous, and where they were of importance in the economics of the ancestral horde. The birch meant is the *Betula alba*, or white birch, and its uses in primitive conditions are numerous and familiar, as are also those of willow twigs.

All this is well known, and therefore not new. But the conclusion which has been drawn from it in favor of the derivation of the Indo-Germanic peoples from the habitat of the birch in the north of Europe is seen to be unsubstantiated, when we learn that the *Betula alba* flourishes all through Siberia, from the highlands of Afghanistan to Japan, and that two closely allied species, the *acuminata* and the *bhojpattra*. are found in various parts of the Himalayas, and in the mountains of central Asia. In Iran and on the plains of Turkestan none of these trees occurs. It would seem, therefore, that this single verbal identity does not carry us far.

To show how close the correspondences of the names of the tree are, I will quote some: English, *birch;* High German, *birke;* Hindustanee, *burj;* Sanscrit, *bhurja;* Italian, *bedoja;* Latin, *betula;* Irish, *beithe*, etc. It is a marvel to see how through unnumbered generations and over so many thousands of miles the word has retained its physiognomy.

### Slavic Archæology.

Dr. Lubor Niederle is privat-docent in the branches of anthropology and pre-historic archæology at the University of Prague. That city is quite decidedly Check or Slavic, and much of the instruction is carried on in the Bohemian dialect of that tongue. In it, also, Dr. Niederle publishes his works, the last of which treats of pre-historic man in Europe with especial reference to the archæology of the Slavic countries. The title is "Lidstvo v Době Prědhistorické." It is to be hoped that of a portion of it he will prepare an abstract in French or German, as the Bohemian is a dialect with which most scientists are not familiar. The importance of such an abstract is the greater because many Slavic observers, especially local archæologists, have in late years taken

to publishing their articles exclusively in journals in their own tongue, and it thus becomes very difficult to follow their researches.

All who have interested themselves in proto-historic European ethnology are aware of the obscurity that reigns over the relationship of the early Slavonic tribes; it is only one degree better than the quite impenetrable fog surrounding the Celts. Their craniology is wholly conflicting; and to-day, if an anthropologist were to speak of "the Slavonic type," I should not have any idea whether he meant a blonde or a brunette, a long skull or a broad skull, a short or a lofty stature, narrow or wide eyes. The Slavonic languages, however, are permanent testimonies to a former linguistic unity.

## LETTERS TO THE EDITOR.

**** Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

*On request in advance, one hundred copies of the number containing his communication will be furnished free to any correspondent.*

*The editor will be glad to publish any queries consonant with the character of the journal.*

### A Gynandrous Flower-Head.

A GYNANDROUS flower-head of the Iceland poppy is now in my possession. The ordinary seed-case is perfectly formed, including the stigmas. Round it are what should be the stamens; but twenty or more of these are thickened gradually upwards from

POPPY MONSTROSITY.

the base of the filament, ending in a golf-club-like head. On the outer side some of these have anthers more or less completely developed; but in all the inner side is concave, containing three to fifteen or more ovules attached round the edge. The sketch will assist in explaining this extraordinary botanical monstrosity.

J. EDMUND CLARK.

York, England.

### Is There a Sense of Direction?

A RECENT article in *Science* by the facile pen of Dr. Hall on the "Sense of Direction" concedes the absence of such a faculty in civilized man at least, and possibly also in the semi-civilized as well; but he believes beyond cavil that the lower animals do have this gift denied to man.

That which appears to be a "sense of direction" in animals can, I believe, in every case be explained by the power of observation and memory, or by accident.

Men and animals alike, under given circumstances, are compelled to both observe and remember, until the one becomes as easily and unconsciously done as the other, and, for all the purposes of this article, the memory to have existence must be established upon facts learned by observation. It is very well known that an unguided horse returning to familiar haunts will do so over the same route by which he left them, rather than in a direct line by sense of direction. The very few instances recorded of animals returning from incredible distances, over which they had been carried, can doubtless be explained by their having been able to observe the route travelled, or by accident, or by the fact of their being unauthenticated nursery tales, with the possible exception of the homing pigeon, birds of wonderful flight and sight, many of which never reach home, while the arrival of many more is unaccountably delayed. Their ability to return is, I believe, no more fully explained than is the no less wonderful one of the wild water-fowls, which are taught to fly north in spring and south in autumn, or why they fly low one season and high the next, possibly in both instances determined by the character of the upper air-currents.

The case, instanced by the doctor, of the Mexican sheep-herder's ability to minutely describe travellers who had passed days previously might very aptly be used to illustrate the similarity of the mental processes necessary alike in man and animals in the matter of direction. The Mexican herder saw the travellers, to him an unusual sight, his mental perception, unoccupied by impressions other than those caused by these travellers, accurately photographed on his mind, as upon the sensitive plate of the camera, every feature of the outfit. In the case of the man, he perceived as well as saw, and could again reproduce the picture, call it up for the inspection of the mind's eye at will; but in the case of the brute that which has been seen has passed beyond possibility of recall, except by the stimulus of the same impressions repeated, when the impression is recognized as familiar. This is brute memory, possible only as a result of having seen or felt, and capable of being reproduced only by the same external agencies, and their so-called "sense of direction" is rather the faculty of recognizing at sight as familiar that which has already been seen.

If the sense of direction be inherent in animals, we would naturally inquire why it is not exhibited before they have reached mature age and been taught by experience, for it is a matter of common observation with those familiar with domestic animals that the stable-reared animal of whatever species is utterly lacking in anything bearing the faintest semblance to a sense of direction; and it is a fact within the common knowledge of most farmers' boys that cats, foragers by instinct and practice, may be carried a very few miles in a sack and never return, and that the barn-yard cock will not return from a distance of one hundred rods, although mercilessly maltreated by his new associates, for his sense of direction is determined by sight only.

All admit that many animals can and do return to their homes, but the explanation of their ability to do so need not be sought and developed by an intricate process of reasoning, if it is, as we believe, necessary that the animal first traverse the road before it can with certainty return. And in conclusion it is sufficient for me to say that, whatever instincts animals may have in this direction, man has the same, with the additional faculty of reason. In both, observation and memory can be highly cultivated, in the animal by necessity alone, and in both by experience only.

Pueblo, Colorado. H. WORK.

### Laboratory Teaching.

A RECENT number of *Science* contained a note by Professor William P. Mason referring to a statement of mine concerning the early years of laboratory teaching in chemistry. I need not state that I had no intention of withholding credit from any of the pioneers in the development of scientific education, especially from such institutions as the Rensselaer Polytechnic Institute, which, as everyone knows, from the first has been in the foremost rank. I had in mind the course of laboratory instruction in general chemistry which was established for the training of large classes at the Massachusetts Institute of Technology by Professors Eliot and Storer. This method of instruction, adapted to later advances in knowledge and to the needs of individual laboratories, is now in very general use in teaching elementary chemistry.

CHARLES F. MABERY.

### Animal Phosphorescence.

ALL sorts of theories have been advanced to explain generally the real use of these luminous emanations. Some have supposed that the light is intended as an effective aid to the night birds that feed upon this gorgeous fare. But that would certainly be a left-handed provision of nature, quite out of her usually kindly protection. Others, again, guess that the firefly's flash-light is a device to assist him in the search of his own prey. With none of these theories, however, is science fully satisfied, and in the