facts are slowly accumulated upon which general anthropology is founded, there comes the conviction in many cases that we are dealing with customs and beliefs that have already reached the twilight of their existence. The crania in our museums will soon be the only physical relics of many races that can just be said to still exist. The desire has therefore long been expressed for the immediate production of faithful and exhaustive monographs, by competent observers, of many of these fast-fading anthropological shadows. To this demand America is now contributing largely; the present volume relates to the habits, customs, legends, religious beliefs, and geographical distribution of the Californian Indians, information collected by Mr. Powers during three years' residence and travel among those tribes.

This work being the result of personal experiences, and as such of the greatest value, other authorities are necessarily not much quoted, but the reader who would desire a more exhaustive treatment of the subject, can supplement his perusal of this volume by that of the fourth chapter of the first volume of Bancroft's "Native Races of the Pacific States," and it is possible that little more in the way of general Californian ethnological information can be desired. In the introduction it is acknowledged that there is a difficulty in drawing a fine distinction between the Californian Indians and their neighbours, and although there are some customs which appear to differentiate them, these alone are not sufficient, and Mr. Powers considers the "crucial test is that of language." Twenty-eight principal tribes and some smaller ones related thereto are recognised and receive separate treatment.

La Pérouse compared these Californians from their dark colour to the negroes in the West Indies, and Prichard, generalising from the accounts of Rollin and Kotzebue, boldly compared the shape of their heads and features to those of the "Negroes of Guinea, New Guinea, and the New Hebrides." Without however ourselves attaching importance to these assumed or superficial resemblances, the above writers might have adduced another fact for the supposed negroid type from Mr. Powers, who tells us that "all Californian Indians emit an odour peculiar to themselves."

The women of the Kā-rok tribes are described as having, apart from tattooed chins, "a piquant and splendid beauty," which has resulted in much intermarriage with the whites, many pioneers, "including four county officers and the only editor in Klamath County, having taken them to wives." This is another illustration of the pregnant fact, pointed out by many writers during the last few years, that with the Indian tribes in North America there has in many cases been much assimilation, and not only extermination. It is stated, however, that among "half-breed" children a decided majority are girls. "Often I have seen whole families of half-breed girls, but never one composed entirely of boys, and seldom one where they were more numerous." It would be interesting to know the proportion of male to female births among the Californians themselves. Franz Mayer has stated that there are more boys than girls in Upper California. Among the Nozi tribe, whose stature is short, the children "often remain mere dwarfs until they are ten or fifteen years old, when they start and shoot up suddenly eighteen inches or so."

These Californian Indians have a considerable power of botanical discrimination. Of the Patawat tribe it is stated, "there is not the smallest moss or lichen, not a blossoming shrub, or tree, or root, not a flower or vine, no forest parasite, bulrush, or unsightly weed, growing in the water or out, or any sea-weed or kelp, for which they have not a specific name;" and Mr. Powers asserts without hesitation that an average intelligent Indian, even if not a shaman, has at command a much greater catalogue of names than is possessed by nine-tenths of Americans. It is, however, incorrect to say, at p. 419, that savages have no systematic classification of botanical knowledge—"there are no genera, no species." The same remark has been made by Dr. Peschel in his "Races of Man." Dr. Hector, on the contrary, has informed us that the Maoris of New Zealand have not only distinct names for nearly all their plants, but generic names, by which they group plants according to their affinities, in a way impossible to most people who were not educated botanists. These Californians sometimes exhibit morbid anticipations of death. Amongst the Pomo, the authority of Robt. White is given for the fact that aged men and women in early expectation of their demise, frequently dig their own burial-place, and then repair thither daily for months together, eating their repast at the mouth of the grave; whilst amongst the Wintun, Mr. Powers relates that sometimes an aged woman will wear around her for months, the rope wherewith she is to be wrapped when a corpse.

Mr. Powers also contributes a most valuable addition to Californian folk-lore in the numerous legends that have been exhaustively collected and excellently narrated. It becomes a question, however, whether some of these are truly aboriginal, and uninfluenced by the teachings of the early Spanish missionaries; the "Legend of Gard," p. 80, seems to have had a very possible inspiration from Eastern sources.

This work is more intended for the careful study of the ethnologist than to afford extracts for a reviewer; and though naturally a great part of the information has been previously collated, there is not only much that is decidedly new to science, but the whole forms an excellent example of what can be observed and collected by an ethnologist for ethnology. It is likewise another token of "American Progress;" published by the "Department of the Interior," it is distributed to European students, without barter and without price. It is well illustrated, many patterns of facial tattoo marks being shown. A good map also accompanies the volume, the value of which is farther enhanced by an appendix on Linguistics, edited by J. W. Powell, in which a number of vocabularies are given.

W. L. DISTANT

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]

[The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to ensure the appearance even of communications containing interesting and novel facts.]

Sunshine Cycles

IN NATURE, vol. xxi. p. 81, your correspondent, Mr. B. G. Jenkins, with the best intentions, yet does me too much honour

in quoting my name from a former volume of NATURE in 1872, as having then announced a cold wave of climate temperature being due to commence in 1878'8; or, as he is kind enough to say, the very day on which the severe winter of the years 1878 and 1879 did begin.

I must decline, at all events, the full honour, for these two reasons: *firstly*, the quoted datum was intended by me to signify the middle, not the beginning, of that cold wave; and as that lasted thirteen months, my date was between six and seven months too soon. *Secondly*, when I published again on the subject in the *Edinburgh Astr. Observations* of 1877, I indicated not 1878'8, but 1877'8 as the probable date of the then coming, now past, wave of cold, or erred much more than in 1872.

I have recently been looking into the reason of that latter calamitous failure, and find it clearly enough now on the plates of projections in that volume in this fact—that the then expected minimum of solar spots was inserted for 1877'5, or nearly two years sooner than sun observations have since then shown it to be. Rectifying, therefore, now that quantity, and in the then absence of our rock thermometers (which had first indicated the remarkable cycles of temperature in striking connection with the whole period, though not the details, of the sun-spots) using merely air-temperatures and re-drawing the curves, the middle epoch of the late cold wave comes out 1879'1, and of the next hot wave 1880'8.

Now these hot waves, I have always maintained, are more important, more regular, and more directly of solar origin, than the cold waves which are rather due to some indirect earthly effects of watery vapour and its transformations. It may be worth while, therefore, when we are now, as I believe, on the threshold of one of the heat-waves, to mention shortly the data on which the expectation is founded.

These are mainly the actual observations of no less than five occasions of such maxima of temperature occurring in a peculiar kind of dependence on successive sun-spot minima; or rather on the beginning, in each case, of the forces of a new spot cycle. The last such heat-wave was in 1868'8, or 1'8 year after the then last sun-spot minimum. Next before that in 1857'9, or 1'9 years after its previous sun-spot minimum. Before that, in 1846'4, or 2'4 years after the same solar test. Before that again, but then depending only on old atmospheric temperature observations, as our rock thermometers were not then existent, in 1834'5, or 1 year after; and still further back, in 1826'5, or also about 1 year after the then last sun-spot minimum.

These intervals from one to the other of the hot waves are by no means arithmetically equal, being 10'9, 11'5, 11'9, and 8'0. This last (really the earliest of the series) is a frightful inequality, but is borne out, *first*, by the sun-spot period of that cycle as given by M. Schwabe, having been also anomalously short; and *second*, by this remarkable testimony, which I have only just become acquainted with, in a pamphlet of most independent character by Sir Robert Christison, Bart., M.D., on tree-growth, read before the Botanical Society in Edinburgh:—

"The wonderful season of 1826, when warmth and sunshine, commencing with March, ended only with September, and when the summer was continuously such as to change in some respects the habits of the people."

The year 1826 was therefore a crucial case, not only for a maximum of temperature and sunshine in Scotland, but for its keeping such remarkable pace with the then anomalously shortened period of sun-spots. While the presently coming case of 1880 will equally prove, by what I have detailed above, that no certain success in weather predictions for several years beforehand can be hoped for, unless the dates of sun-spot minima can be also announced by authority beforehand to a very much smaller quantity than two years of error; and that no *mean* duration of the sun-spot cycle comes close enough to the fact of the large variations between one cycle and another. We must have therefore each cycle of sun-spots fixed by its own dates alone, and not smoothed away and improved out of creation by being made apparently conformable to others.

I have not yet seen, by those able men who believe they have traced sun-spots to planetary influences of position on the sun, any attempt, from the planetary places in almanacs, to compute the dates of all the solar minima of spots, say from 1825 to 1900. But something of that kind appears now to be necessary for the next steps of the science of the future.

PIAZZI SMYTH

15, Royal Terrace, Edinburgh, January 9

Cranial Measurements

IN the notice of my catalogue of crania which you have been good enough to insert in NATURE, vol. xxi. p. 222, your reviewer has given me credit for originality of method, to which I have no wish to lay claim.

1. In reference to the mode of taking the horizontal circumference, it is said that I pass "the tape line, not over the prominence of the glabella, as is customary with craniologists, but above it, around the supra-orbital line." The fact is, that the method which I have adopted, so far from being a deviation from what is customary, is that recommended in the valuable "Instructions Craniologiques," drawn up by Broca and published by the French Anthropological Society, and which is used, certainly by the large majority, if not by all the craniologists with whose writings I am acquainted.

2. With regard to the more important measurement of the antero-posterior diameter of the cranium, more important on account of its influence on some of the most characteristic indices, there are, unfortunately, still considerable differences of method, and it was only after very full consideration of the subject that I decided not to follow the French instructions, but to adopt the plan used by Rolleston in "British Barrows," by Barnard Davis in his "Thesaurus Cranium," and by the majority of German anthropologists. So fully was I convinced of the expediency of the latter, that after having already measured the whole of the crania in the collection, and calculated the indices by the method which included the prominence of the glabella in the cranial length, I took the trouble to remeasure them, with the results given in the catalogue. The object being to obtain, as near as may be, an idea of the form of the brain-case, it appears desirable to exclude all extraneous projections which have no relation to this form. The impossibility of eliminating every source of fallacy, such as those occasioned by the varying thickness of bone or of diploe, is no argument against endeavouring to reduce them, as far as we can, to a minimum. The projection caused by the development of the frontal sinuses should certainly not be omitted in a complete description of a skull, but it no more affects the form of the cranium proper, than the prominence of the nasal bones or of the maxilla, which, important and instructive as they are from other points of view, are usually ignored in giving what is called the maximum length of the skull, although, if the term is to be taken in its literal sense, they have as much claim to be included as the glabella or supra-orbital ridges.

Many other arguments might be adduced and authorities given for the usage I have adopted, but I will bear in mind your request for brevity.

W. H. FLOWER

Royal College of Surgeons, January 11

"Why the Air at the Equator is not Hotter in January than in July"—Freezing of the Neva

IN NATURE, vol. xxi. p. 129, Mr. Croll gives his reasons why the equator is not much warmer in January than in July, notwithstanding the greater nearness of the sun at the former season. To state the case briefly, he, having recalled the fact that the whole earth is colder in January than in July, because in the former the cold winter of the northern (or principally land) hemisphere coincides with the mild winter of the southern (or principally water) hemisphere, he continues: "Consequently the air which the equatorial regions receive from the trades must have a higher temperature in July than in January. The northern is the dominant hemisphere; it pours in hot air in July and cold air in January, and this effect is not counterbalanced by the air from the opposite hemisphere. The mean temperature of the air passing into the equatorial regions ought therefore to be much higher in July than in January, and this it no doubt would be were it not for the counteracting effects of eccentricity." And further: "There is another case which must also tend to lower the January and raise the July temperature of the equator: the northern trades pass farther south, and consequently cool the equatorial regions more during the former than the latter season."

I maintain that there is no such influence of the northern trades on the temperature of the equator, because they scarcely anywhere reach it, and then because the lower latitudes of the northern hemisphere are not colder in January than those of the southern hemisphere in July. In the Atlantic the northern trades do not reach the equator at all in January, but only in February, March, and April, and this but in the western part of the ocean.