jective effect, to which the varying intensities of the water-vapour lines in the normal Fraunhofer spectrum is a contributory cause. Mr. Mitchell suggests that very fine measures of the displacement of spot lines, caused by the sun's rotation, might settle the question as to the solar origin of the apparent intensification, and concludes that, as yet, the evidence adduced by various observers in favour of the presence of water vapour is by no means satisfactory.

THE PALISA AND WOLF CELESTIAL CHARTS.—Dr. Palisa announces that the second series of Celestial Charts, prepared by Dr. Wolf and himself, is now ready, the price, if ordered from him, being 30*s.*; the bookseller's price is 35*s.* After the end of November this series will cost the purchaser 40*s.*, wherever purchased. Dr. Palisa's address is "The Observatory, Vienna, Austria."

THE PIMA AND TLINGIT INDIANS.[1]

THE introduction to the twenty-sixth annual report of the Bureau of American Ethnology (1904–5), 1908, by the chief of the Bureau, Prof. W. H. Holmes, indicates that the staff are zealously carrying on the work of the department. The report itself contains two excellent

FIG. 1.—Pima woman making pottery: supporting vessel on loose sand.

memoirs, one on "The Pima Indians," by Frank Russell, and the other on "Social Condition, Beliefs, and Linguistic Relationship of the Tlingit Indians," by John R. Swanton.

As Mr. Russell's memoir is a monograph of the Pima, he naturally pays a good deal of attention to the arts and crafts and food supply of the people, his account being fully illustrated. The Pima keep an annual mnemonic record of events by means of notched sticks. "The year notches are exactly alike. . . . Dots or shallow circular pits and short notches are the most common symbols on the sticks. These have no distinctive meaning, and are used for recording a great variety of events," but they never make a mistake. One man who lost his stick continued his history with pencil and paper, and this "introduced a tendency to use pictorial symbols rather than merely mnemonic characters, such as are most easily incised on the surface of a stick."

With all their surplus energies expended in warfare, the young Pima men formerly lived exemplary lives as compared with the youths of the last generation. Before the Pimas came in contact with "civilisation" chastity was the rule among the young women. On reaching puberty there were several taboos, and there was "danger" in the girl that must be breathed out by songs ere she, the members of her family, and the community as a whole were exempt from the hazard of the lightning stroke and other perils. The youths marry "early and often." In the majority of cases the choice is made by the girl, who seeks to avoid an alliance with a lazy man. Polygyny was practised to some extent, but the division of labour was such that no great economic advantage resulted. There were no groups within the tribe between which marriage was prohibited. Divorce was easily effected. They often had large families, and twins were received with general rejoicing. Male children were preferred, because "they would grow up to fight the Apaches." So strong was the feeling of the Pimas against the abnormal that they tried in recent years to kill a grown man who had six toes. Under the head of "Baptism" we find the following information:—at child-naming the child was held aloft to receive the first rays of the rising sun. Beads were formerly held up to receive the first rays of sunlight, and were then placed about the child's neck.

Descent is traced in the male line, and there are five groups that may be called gentes, though they exert no influence upon marriage laws, nor do they manifest any evidences of organisation so far as ascertained. The

FIG. 2.—A Piman holding a Calendar Stick.

Pimas are governed by a head chief and by a chief for each village. These men are assisted by village councils, which do not, Mr. Russell believes, appoint any representatives to the tribal councils. The head chief is elected by the village chiefs. The tribe acted as a unit against the dreaded Apaches. The slaves taken by the Pimas were chiefly from the ranks of the Apaches or their allies; they were well treated. The Pimas held possession of the best agricultural land in their section of the south-west, and were compelled to fight for the privilege. There was no law among them observed with greater strictness than that which required purification and expiation for the deed that was at the same time the most lauded—the killing of an enemy. Numbers of myths and songs are cited. The Pimas are far less given than their pueblo neighbours to the outward show of religion. The sun was appealed to. At the present time two deities are recognised, Earth Magician and Elder Brother. They live in the east, dividing the control of the universe between them. The stars are living beings. Some declared that at death the soul passed into the body of an owl, others that after death it went to the land of the dead in the east. Again, souls are supposed to hang about and perform unpleasant pranks with the living.

There are fourteen geographical groups or tribes of the Tlingit or Koluschan, each of which had at least one winter village and a section of coast where they camped

[1] Twenty-sixth Annual Report of the Bureau of American Ethnology, to the Secretary of the Smithsonian Institution. Pp. xxxi+512; 58 plates. (Washington: Government Printing Office, 1908.)

in summer and behind which they hunted in winter. As a whole, they are divided into two exogamous phraties with matrilineal descent, one called Raven, the other usually Wolf, and in the north Eagle as well. One small group outside both phraties could marry into either. Each was subdivided into clans or consanguineal bands, which originally appear to have occupied a particular camp. The larger geographical groups contained members of both phraties, and usually numerous clans. Finally, the clans are subdivided into house groups. Each clan claimed a few distinctive carvings and names; occasionally they might be borrowed. The house names and clan names were generally distinct, and confined to their respective phratry, but a man sometimes claimed the right to the house name owned by his paternal grandfather's clan, so that names sometimes go out of the clan. Those of a man's own phratry are called "friends," those of the opposite phratry "opposites" or "my outside shell." A list is given of the relationship terms. The importance of the phratry system is indicated by the rules of etiquette and the hospitality shown towards members of the same phratry, and the performance by the opposite phratry of certain functions at birth and death.

A mourning feast is given to members of the opposite phratry, food being put into the fire for the spirit of the deceased. All property given away or destroyed at a feast was dedicated to some dead person, who then actually received its spiritual counterpart. A Tlingit employed his opposites to do everything—put up his house and pole, pierce the lips and ears of his children, and initiate them into the secret societies. The secret society dances were imported from the south, but their observance by no means reached the importance attained among the Kwakiutl and Tsimshian. Whistles were essential concomitants of these dances. The putting up of a house or pole, and the accompanying secret society performance, feasts, and distributions of property were all undertaken for the sake of dead members of a man's clan. Rivalries between opposing parties of dancers at a potlatch often resulted in serious conflict, but the host's people often prevented them by rushing between them bearing their emblem or making the call of the phratry animal. A. C. H.

RECENT PUBLICATIONS ON AGRICULTURE FROM INDIA AND CEYLON.

THE recent issues of Circulars and Agricultural Journal of the Royal Botanic Gardens, Ceylon, contain interesting papers on cotton, *Hevea brasiliensis*, and other native crops. Mr. Lock issues a concise guide to the plots on the Experiment Station, Peradeniya, which will prove useful to visitors, and will, we hope, be the forerunner of a work setting out the general results obtained in the Ceylon experiments and the conclusions to be drawn from them. Mr. Petch deals with certain abnormalities in *Hevea brasiliensis*. Nursery plants with twisted stems are frequently sent in for examination and report. The stem generally makes a complete turn at the base, either in a regular curve or a combination of curves and abruptly angular bends; in other cases there are two complete turns, and in a single instance three have been observed. It was found possible to reproduce some of these abnormalities by varying the position of the seed in the soil. The insect pests—which mainly attack the root, since the rest of the plant is to a large extent self-protected by the viscid caoutchouc-producing latex—are dealt with by Mr. E. Ernest Green. Mr. Bamber deals in one pamphlet with tapioca, describing its method of cultivation in Malacca, and in another with the cultivation of strong-growing plants to overrun and "choke" weeds in rubber plantations. The plants suggested are *Passiflora foetida* and *Mikania scandens*; *crotolaria* is also used. When growth has attained its maximum, and before the plants die down, the whole mass of material, usually 12 inches to 18 inches deep, can be rolled up like a huge carpet, leaving the surface soil quite free from weeds. Mr. Jowitt describes several of the oil-yielding grasses, and Mr. Stewart McCall puts in a plea for the more extensive cultivation of cotton. Altogether the papers are fully up to the high standard we have learnt to associate with Peradeniya.

It has already been remarked in these columns that the *Agricultural Journal of India* ranks for general excellence among the best agricultural publications in the world, and the recent numbers in no way alter the impression. The list of articles includes several dealing with improved methods of cultivating cotton and paddy, besides a well-illustrated paper on improved implements of home-make adapted to the special conditions of the native cultivator. Mr. Maxwell-Lefroy deals with Eri or castor silk, and Mr. Marsh discusses certain indirect benefits of irrigation not generally recognised. Among these are the possibility of substituting new sowings in case of accidents to advanced crops, the certainty of fodder for the cattle, which are among the worst sufferers in time of drought, and the general improvement of the people and country which inevitably results when the conditions of life become stable. The journal is issued quarterly from Pusa, and the articles are well written from a general point of view; it may be confidently recommended to all interested in Indian affairs.

Probably no publication could give a better idea of the enormous size of India, and the great diversity of conditions, than the two volumes of agricultural statistics brought out by the Government of India. The first volume deals with British India, and contains 429 folio pages of closely printed figures; the second contains the records of native States, and is smaller. Comparing the year 1906–7 with 1897–8, the earliest given in the volume, we find the following areas, in acres:—

	British India		Native States	
	1897–98	1906–07	1897–98	1906–07
Net area cropped ...	196,497,232	214,026,319	10,120,324	14,923,731
Irrigated...	30,418,454	36,653,903	1,425,895	1,982,668
Total food grains ...	182,725,689	195,117,838	9,126,337	13,123,691
(Rice, wheat, maize, pulse, &c.)				
Other food crops ...	5,773,267	7,274,340	369,392	561,431
(Gardens, orchards, spice, &c.)				
Total oil seeds ...	12,366,648	13,965,315	603,076	836,335
Cotton	8,914,996	13,771,214	279,758	625,694
Indigo	1,366,513	448,594	1,731	18,782

This steady, all-round increase in the area under the various crops furnishes abundant proof of the increasing prosperity of India, and must be a source of great gratification to the British administrators and advisers through whose labour it has been made possible. The one exception in the general prosperity is indigo. During the ten years the area has shrunk from more than one and a third million to less than half a million acres. The indigo planters are a highly enlightened body, and look to science to help them save the industry; their fortunes are very much involved in the contest now going on between the agricultural chemist and the synthetical organic chemist.

POSITION FINDING WITHOUT AN HORIZON.

THE Journal *Ila* of July 17—an aëronautical journal published at Frankfort—contains an article which in some respects is supplementary to that on the subject of position finding without an horizon which appeared in NATURE of July 22, or, as this article was the later in time, perhaps it would be more correct to say that it was supplementary to the one in *Ila*. The latter, which is written by Dr. Alfred Brill, relates to the reduction of observed altitudes for the purpose of finding position by means which can be quickly and readily effected in a balloon. After showing the inconvenience of the usual trigonometrical methods used on board ship, and how tiresome the use of tables must be which correlate time, latitude, declination, and altitude, he proceeds to describe his method, which is one eminently suitable and convenient, that is, where a graphic method is sufficiently accurate.

Dr. Brill employs a circular map of, say, Central Europe on transparent celluloid, the projection being one of least distortion. Before and behind this are two more sheets of celluloid, with the Sumner equal altitude circles drawn on the same projection. These sheets each have a central longitudinal azimuth line, while the map is provided with a circle of degrees round its periphery. The two Sumner sheets can be moved longitudinally on rollers like blinds, and these two and the included map may be turned in