EARLY INSTITUTIONS.

Our early economic history. — Professor Meitzen of Berlin reviews von Stein's '*Drei fragen des grundbesitzes*,' and takes occasion to say a great deal that is interesting upon the land-question and the past history of land-holding. One or two points may be noted here. Had we space, we should note other points. The article is significant in many ways. Von Stein makes collective possession and ownership of land the starting-point of our economic development; but Prof. Meitzen says, what is certainly true, that, so far back as the time of Tacitus, private property in land existed everywhere. This property consisted regularly of hides, what the Germans call *hufen*. Attached to these hides were shares or rights in the undivided land,— the *almend*. The hides were divisible in the early time. It was during the feudal period that they came to be indivisible. Without doubt the land was common, open to everybody, during the period of migrations,— the nomad period; but this condition of things did not last long. The land in one place supports only a limited number of animals. A large number cannot graze together. Separate districts were accordingly assigned to separate herds, or several small herds together. These herds would belong to different families. While some of these families grew rich and powerful, others grew poor and weak. The latter were driven from their lands, or reduced to dependence and servitude. Then, as there were dependents and slaves to do the work, agriculture arose. Hides were assigned to the cultivators, which were the property of their respective lords. It is probable that the undivided common land was at this time subject to appropriation. Every man could have, therefore, as many hides as he wanted. It was at a later time, probably, that the common land became subject to communal regulations. This is Prof. Meitzen's theory, as we understand it. It is certainly a great advance on the old theory of primitive equality and communism. Prof. Meitzen says, "Es ist also allgemeine gleichheit der alten Germanen eben so fabel wie allgemeine freiheit." — (*Jahrb. nationalökon. stat.*, Jan. 13.) D. W. R. [528

Land-holding in Damaraland. — C. G. Büttner describes how the land is free to everybody; how the individual appropriates as much of it as he pleases, wherever he pleases, provided he does not, in so doing, trespass upon land already appropriated. There are no boundaries between one man's land and another's; only it is generally considered wrong to enter upon land that has been brought under cultivation by another. The chief wealth of the people consists of flocks and herds, which are driven about from place to place by the owners or the herdsmen. Family life is patriarchal. Slavery exists in a mild form. "Whatever a man puts his hands upon, that is his private property." The writer, or his translator, calls this communism! — (*Pop. sc. monthl.*, March, 1883. From *Ausland.*) D. W. R. [529

Slavery in Europe. — M. Fournier gives us a long article upon the liberation of the slaves in western Europe between the fifth and thirteenth centuries. He considers the parts taken by the church and state respectively in this movement, and concludes that the church was far less instrumental in bringing about the abolition of slavery than has been generally supposed. — (*Rev. hist.*, Jan.-Fév., 1883.) D. W. R. [530

INTELLIGENCE FROM AMERICAN SCIENTIFIC STATIONS.

PUBLIC AND PRIVATE INSTITUTIONS.

New-York agricultural experiment station, Geneva, N.Y.

Variability of maize. — Were the different forms of ear-corn, raised from seed of uniform appearance, shown to one not acquainted with the variability of maize under hybridization, the collection would be referred to many varieties, and perhaps to several species. Even to one who has made a study of the subject, there is a constant series of surprises. As a slight contribution to the subject of the hybridization of corn, I note the following forms as gathered from a small plat planted with fine, uniform-appearing seed of 'podded' corn from an unknown source.

This podded corn is that curious variety wherein each kernel, as well as the whole spike, is surrounded by a husk. It is known under various names; such as, husk corn, Paraguay corn, Texas corn, wild corn, Oregon corn, etc. The variety planted showed a yellow, dent, elongated kernel, each kernel husked, and of a uniformity which suggested an extreme purity or fixity of type.

The crop harvested yielded: 1°. Tassel-corn, — some of the kernels heavily, others slightly husked, and others bearing, in all but size, a most striking resemblance to sorghum-seed, both in shape and structure, and the husk changed to a glume; 2°. Ears with kernels uniformly and lightly husked; 3°. Ears in which the kernel-husk has increased in abundance and length on successive ears, until at last the husk predominates over kernels; 4°. Ears of husked grain, the rows arranged in pairs, the apex of the husk of each of the rows of each pair facing inward; 5°. Some husked ears, but the kernel-husks pure white in some specimens, tinged with red in others; 6°. Fastigiate ears, i.e., a whole mass of ears, each ear occupying the position of a kernel on the cob, and arranged parallel to each other; 7°. Unhusked corn, — red cob, yellowish-white dent kernel, with a sprinkling of sweet-corn kernels through cross-fertilization; 8°. A dark purplish-red ear of unhusked corn, — a dent corn, mingled with some dark-red kernels of sweet-corn.

Variations equally surprising have occurred with us from a fine-appearing white 'pearl' pop-corn used as seed. From the crop, we selected nine ears, any one of which might well be referred to a distinct variety. Some of the ears formed 'rice-corn,' or the kernels mucronate; other ears had the smooth, round, stony grain of the pearl varieties; other ears had taken on the appearance and size of a field flint-corn. The colors varied from white, through the buffs, to yellow, and from light red to dark red, forming, in the nine specimens, nine different colors or shades. The number of rows also differed, and the size and shape of ear.

In habits of growth, some varieties of corn bear the ears on the nodes quite low down, others on the higher nodes; but no variety, so far as numerous observations extend, bears ears on the five upper nodes of the plant. Yet in individual variations a perfectly husked ear is borne on the first node from the tassel; and even four well-husked ears have been found borne grouped around this first node.

While, normally, ears are produced from the axil of

the leaf (i.e., are axillary branches), yet in individual variations a branch may occur in this situation, and one or more ears be borne upon this branch, one ear being terminal.

The tassel may be transformed into groups of ears, the whole character of the tassel being occasionally changed to such an extent that the pistillate flowers replace the staminate. The bearing of a few grains upon the tassel is by no means an unfrequent occurrence. In the case of the tassel bearing many grains, there is a tendency in the upper leaf to curve upward and form a husk, and in cases a fair protection is thus secured.

On the other hand, the terminal portion of the normally situated ear may be extended so as to form a tassel which bears staminate flowers. In rare cases we have a normal appearance of ear for several inches, then a few inches of staminate flowers, and at the end a good ear again; the two perfectly formed ears being connected as if by a section of a tassel-stem, and forming a structure protected by a common husk. Staminate flowers are also occasionally produced on the rachis, along with the normal pistillate flowers; and I have even observed hermaphrodite flowers, — in one case on the cob, and in two cases on the tassel. In cases, also, the ears are branched; the branches starting from the base, or from the middle or terminal portion of the ear. In the tassel we quite frequently find ears crowded together through partial coalescing of the branches, so as to form a corolla, or cup, from which the main stem of the tassel emerges; and, in their normal situation, ears are occasionally so crowded, through branching, as to form a sort of bouquet. The tip of the ear may also divide into many smaller portions, forming the appearance of a tassel-like bunch of cobs terminating the grain-covered portion.

The rows of corn are always even-numbered, but may vary from 8 to 32 in varieties, and, in individual specimens, from 4 to 48. In two ears from the same stalk the number of rows may vary; the length of ear, from 2 to 12 inches in varieties, and in individual variations perfect ears may be found from 1 to 16 inches in length. The kernels are occasionally arranged upon the cob in a spiral. The size of the grain is also subject to great variation. In our collection, normal kernels of a variety called 'miniature' maize weighed one-half a grain, while normal kernels of a variety known as 'Benton dent' weighed 12 grains.

The shape of the grain is very varied. It may be longer than broad, or broader than long, varying from oval to shoe-peg form in flat and spherical variations; the upper surface rounded, or flattened, or pointed, or dented. The dent may be a central depression, as a notch, or a crease, or irregular. A cross-section is in some varieties square, in others rectangular, in others round, in others oval, in still others irregular. The structure may be all farinaceous, as in the Tuscarora; or semi-transparent and hardened, as in sweet-corns; or hard and horny, as in the pop-corns; or partly farinaceous and partly corneous, as in the common flints and dents. The chit also varies in length in the varieties, and in the form of the depression in which it lies; and the pedicle of the grain may appear strongly marked, as in the 'pod-corn.'

In germination, occasionally twin-embryos are formed, and in one case we have noted three. The roots may emerge from the base of, or may crowd off, the caulicle, and appear from the under side, or, in cases, may emerge from the caulicle at apparently any point. From the first node they almost invariably emerge. We thus seem to have a double system of roots, — the tap-root, emerging from the base; and the fibrous roots, which emerge from the sides of the caulicle. In exceptional cases the tap-root seems suppressed and the fibrous roots of the monocotyledon appear in its stead.

After the corn-kernel has germinated, it may be thoroughly dried, and will then start anew when planted. The plumule retains its life while new roots are formed, or exceptionally the descending axis retains its life, and renews its growth. This we have repeated to the fifth germination, with intervals of one week's drying between germinations. In one instance of variation a twin-embryo sent up two cotyledons, one of which afterwards developed into a leaf. This was the only case among many hundreds of observations.

E. LEWIS STURTEVANT, *Director.*

March 13, 1883.

University of Cincinnati.

Laboratory notes. — Several investigations, conducted under the direction of Prof. F. W. Clarke, are far enough along to warrant preliminary notices.

The phosphides of platinum have been prepared by O. T. Joslin. When phosphorus is thrown upon white-hot platinum, fusion takes place, and a brittle, silver-white button of Pt_3P_5 is obtained. This, treated with hot aqua regia for at least forty hours, only partly dissolves. The soluble portion agrees sharply with the formula Pt_2P_4, and PtP remains absolutely insoluble. By long roasting in a muffle, the original Pt_3P_5 is reduced to Pt_2P. The Pt_2P_4 is probably identical with the phosphide described by Schrötter as PtP_2.

The tartrates of antimony are being studied by Mr. C. S. Evans, and one set of results is complete. When alcohol is added to a solution of Sb_2O_3 in aqueous tartaric acid, a white precipitate is formed, concerning which earlier experimenters differ. We now find, that at least three distinct compounds may be thus produced, as follows: when there is a large excess of tartaric acid, the neutral salt $Sb_2(C_4H_4O_6)_3 . 6H_2O$ is thrown down. With a slight excess of acid, $Sb_2(C_4H_4O_6)_2 O . 6 H_2O$ is produced. The third compound should be $Sb_2(C_4H_4O_6)O_2$, and is said to have been described by Berzelius. We have obtained a compound approximating to this formula, but it was not absolutely pure. All three salts may be regarded as derived from Sb_2O_3 by successive replacements of one, two, and three atoms of oxygen by $C_4H_4O_6$.

The specific gravity of cadmium iodide is given, on Bödeker's authority, as 4.576. Mr. E. A. Kebler, assisted by Mr. E. Twitchell, has prepared the compound in a variety of ways; and we find that two distinct modifications exist. The normal CdI_2 has a specific gravity of 5.6 to 5.7, and is very stable: the other ranges from 4.6 to 4.7, is deliquescent, and decidedly unstable. The conditions governing the formation of the latter have yet to be made out. The normal salt represents union of cadmium and iodine without change of volume.

NOTES AND NEWS.

— The lecture season at the Lowell institute in Boston is drawing to a close. So far back as most of us can remember, the institute has annually tempted some distinguished scientific Englishman or other European to lecture to Boston audiences, and has done, perhaps, as much as any other establishment in the country to elevate the scientific standard. This year an unusual variety has been offered, and the au-