finally imbedded in the terrace from which it was recovered after the manner detailed by Mr. Huston. The bones of the cranium are exceptionally heavy and massive, indicating that the skull pertained to an adult male. The frontoparietal surface is gently but regularly concave, the depth of the concavity being 18 mm. This surface is likewise very rugose. The horn cores are directed abruptly downward and a little inward distally, in so far as they are preserved. The extremities of both horn cores are wanting. The expanse of the horn cores equals but does not exceed that of the orbits. There are rather large frontal sinuses. These, as well as the various foramina, contain a considerable number of pebbles, nearly all of which are of local origin. Among them are two rather large fragments of coal. The character of the enclosed pebbles would seem to indicate that the specimen had not come much in contact with glacial detritus from the north.

The characters of the skull are such that I have no hesitancy in referring it to *Ovibos cavifrons* Leidy, first described by Dekay in 1828 as *Bos pallassi* in the *Annals* of the Lyceum of Natural History of New York. The chief interest attached to the present specimen comes from the additional evidence it affords as to the faunal changes brought about over this region during the glacial period. The remains of this animal have now been authentically reported from Fort Gibson, I. T.; St. Louis, New Madrid and Benton Co., Mo.; Trumbull Co., Ohio; Big Bone Lick, Ky.; from two different localities in Pennsylvania; and from Council Bluffs, Iowa and West Virginia. In every instance these remains have been recovered either directly from glacial deposits or from deposits that have been correlated with some stage of the glacial period. Since there would seem no good reason for assuming that the musk ox at that time preferred climatic conditions very different from those with which they are at present surrounded, the reasonable inference would seem to be that with the advancing ice they moved southward until their range reached an extreme limit averaging a few degrees, perhaps three or four, beyond the southern limit of the ice.

J. B. HATCHER.

CARNEGIE MUSEUM.

EXCEPTIONS TO MENDEL'S LAW.

DE VRIES, Correns, and some other writers have called attention to a number of apparently important exceptions to Mendel's law. In order to show the relation of these exceptions to the law, the law itself may be illustrated as follows: A and B are two plants, each of which is self fertile and which may be hybridized. Regarding any single respect in which these two plants differ, the resulting hybrid is a mono-hybrid. We will assume that the character B is recessive in the hybrid, representing the character by a small letter in cases where it is latent. The following diagram shows the results of hybridization, as far as the second generation.

			Pollen.		Ovules.	Types of plant produced.
Male parent	A		A	×	A	A
		Ab	A	×	B	Ab
		(Hybrid)	B	×	A	Ab
Female parent	B		B	×	B	B

This diagram shows that from the two kinds of pollen and two kinds of ovules produced by the hybrid plant Ab we get four fertilizations: A × A, which gives plants of the type of the parent A; B × B, which gives plants like the parent B; A × B and B × A, which give again the hybrid Ab.

It should also be stated that since each of these four crosses will occur an equal number of times according to the law of probabilities, the type A will constitute one fourth of the second generation, B one fourth, and Ab one half.

Mendel's law, as first stated independently in this country (Bul. 115, Off. Ex. Sta., p. 93) and essentially as stated by himself, is as follows: In the second and later generations of a hybrid there occur all the possible combinations of the characters of the parents, and in definite proportions.

But hybrids have been found in which this seems not to be the case. The explanation of a number of these is here offered. Millardet, De Vries, Correns and others report cases of

so-called false hybrids, in which in the second generation the hybrid splits up into the parent forms only. It is easily seen from what follows that this will necessarily be the case when two plants are crossed each of which responds to its own pollen more readily than to that of the other. Cases like this are not infrequent. Referring to the above diagram, we get the hybrid Ab in the first generation by offering to ovules of B pollen of A only. But when the hybrid produces pollen and ovules, both A and B ovules are supplied with both kinds of pollen; hence we get no hybrids in the fertilization of the ovules on the hybrid. That is, $A \times A$ and $B \times B$ give fertile seed and $A \times B$ and $B \times A$ fail because their ovules are supplied with both kinds of pollen and each responds more readily to its own than to that of the other. Instead, therefore, of being an exception to Mendel's law, Millardet's false hybrids fully conform to that law and are explained by it. Correns' proposed explanation of this case (See *Ber. Deutsch. Bot. Gesel.*, April 24, 1901) as a limiting case of a series, which is itself not satisfactorily accounted for, cannot be accepted.

Another case: sometimes a hybrid, instead of showing progeny made up of plants, one fourth of which are like the male parent, one fourth like the female parent, and one half like the hybrid, as is the case under Mendel's law, seems at once to be fixed in type, and produces progeny of its own type only. From what follows it will be seen that this is necessarily the case, if Mendel's law is true, when the two plants are each self-sterile or when each responds to the pollen of the other more readily than to its own, which is not infrequently the case. Referring again to the above diagram illustrating Mendel's law: $A \times A$ fails in this case because A ovules are offered both A and B pollen and they fertilize only with B pollen. Similarly, B ovules are offered both A and B pollen and they fertilize only with A pollen. We get therefore the fertilizations $A \times B$ and $B \times A$, both of which produce only the hybrid. Again we see that Mendel's law offers a perfectly rational explanation of what has been stated as an important exception to it. In this case I would suggest to those who are in a position to do so that the above explanations, which I present only as hypotheses as yet, may be easily put to test, by taking those cases in which these exceptional hybrids occur and ascertaining whether or not the hypotheses here proposed accord with the facts regarding the relative sterility of the plants towards their own pollen and that of the other party to the cross.

Many other apparently abnormal cases are to be explained on similar grounds; for instance, if one plant is self sterile or responds more readily to pollen of the other plant than to its own, while the other responds with equal readiness to both kinds of pollen, we would have a case like the following (see diagram): $A \times A$ would not occur, because A being offered pollen of both A and B, all the A ovules fertilize with B pollen. $A \times B$ and $B \times B$ will occur as in the diagram. $B \times B$ will constitute one fourth the progeny, while three fourths will consist of the hybrid Ab; such apparent anomalies are therefore entirely consistent with Mendel's law.

Some time in the near future I shall present another case which seems to be a real exception to this law (Correns' series above referred to) and shall offer an explanation for it and the results of experimental data.

W. J. Spillman.

Bureau of Plant Industry,
U. S. Dept. Agric.

A REALISTIC DREAM.

The following statement concerning a remarkably realistic dream was written in the form of a personal letter by Dr. Charles A. White to his friend Mr. Arnold Burges Johnson, of Washington, D. C.

A VISION.

My Dear Friend:

In compliance with your request I herewith send you an account of the visional dream to which I referred in our conversation a few days ago, together with some remarks upon it and upon certain circumstances connected with its occurrence.