the left. The results are given in the following table.

FIRST DAY.

Scaur. Right.	Scaur. Left.	Flood Plain.
222		245
	55	187
	73	350
96		271
	90	442
73		303
	21	518
	34	273
41		287
76		236
50		280
	31	100
	53	466
95		168
653	357	4,126
In all		5,136
Total both banks		10,272
Total scaur		1,010
Per cent. of scaur		10
Per cent. of scaur on right		64

SECOND DAY.

Scaur. Right.	Scaur. Left.	Flood Plain.
	66	295
56		300
	130	273
120		153
173		225
	195	1,160
	39	144
30		350
	60	245
16		341
178		256
	47	196
	37	100
200		343
48		260
100		1,218
27		78
30		30
	17	259
		180
978	591	6,406
Total		7,975
Total both banks		15,950
Total scaur		1,569
Per cent. of scaur		10
Per cent. of scaur on right		62

Mr. Bowman's pacing gave practically the same results.

As my pace is 2.75 feet, we walked the first day 2.6 miles and the second 4.1, and found each time that along one tenth of its course the Rouge is widening its valley, while two thirds of this work is being done on the right bank. This called Mr. Bowman's attention at once and he will prosecute further studies on this and other streams. Of course, the interest here is in a possible criterion for detecting deflection of rivers by the effect of the earth's rotation. The distance is short, yet the results are singularly uniform, as appears from the following analysis in detail.

Grouping the scaurs by successive amounts of about 500 paces, we have:

Total Scaur.	Right.	Left.	Percentage on Right.
536	318	218	59
474	335	139	71
545	349	196	64
518	224	294	43
506	405	101	80
2,579	1,631	948	64

Rivers ought to show the effect of the earth's rotation and no criterion could be simpler in theory or application than this. As the Rouge flows fairly to the east prevalent westerly winds urge the river neither to right nor left.

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December 7, 1903.

SHORTER ARTICLES.

WONDER HORSES AND MENDELISM.

DR. CASTLE's reference to the Oregon Wonder horse in SCIENCE for December 11 reminds me that in the autumn of 1899 I corresponded with Mr. James K. Rutherford, of Waddington, N. Y., who then owned a horse called Linus II. Mr. Rutherford sent a photograph of the horse, taken in 1898. The photograph shows a Morgan horse probably about five years old with a double mane which trails on the ground on either side for a distance of two feet. The tail trails on the ground for a distance of about six to eight feet. Correspondence with Mr. Rutherford yielded the following additional statements: Linus II. is the son of Linus I., which had a mane that was single, but at fourteen years old eighteen feet long, while the tail was twenty-one feet long. "The mother also had a remarkable growth of hair." The paternal grandmother was known as the 'Oregon Beauty' and was noted for the mass and length of her hair. My correspondence with the owner of Linus I. led to few additional facts. He stated that the long hair had been in the family since importation [to Oregon(?)] and added: 'the growth and quantity has increased with each generation.'

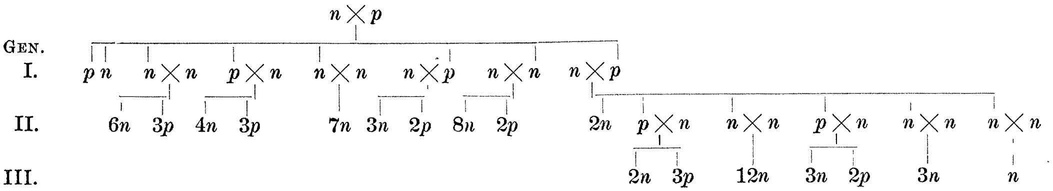
It will be seen that the data are somewhat inconclusive. Had the father as well as the mother of Linus I. been long-haired (recessive, according to Dr. Castle's hypothesis), then we can understand the long hair of Linus I. The latter was mated with a recessive (?) mare (if 'remarkable growth of hair' may be so interpreted) and produced Linus II.

On the whole, it would seem more probable that the long-haired property was dominant, unless, indeed, Linus II. got no long-haired progeny. The data are, as we see, insufficient to decide the matter.

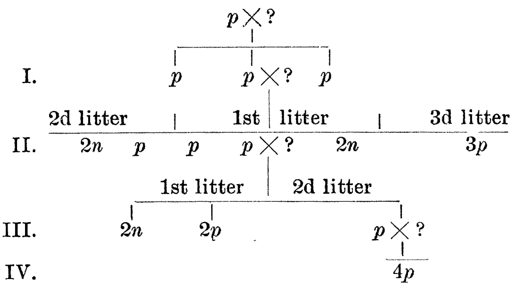
The question of the Mendelian behavior of animal mutations has long interested me and I have collected some statistics bearing on the subject. The records concerning polydactylism are, perhaps, the most complete and instructive. In the *Jenaische Zeitschrift*, XXII., Fackenheim, 1888, has given a table that may be thus summarized: Each letter n (normal) or p (polydactyl) stands for a person, the coefficient being used to indicate the number of such persons in a family.

only *two* cases. The majority of the p offspring should produce p and n in equal numbers in the second filial generation—we get 7 p and 12 n in generation III. and 5 p and 5 n in generation IV. or 12 p and 17 n altogether, which is a wide but not unlikely disagreement from theory. Of the n children mated with n consorts, theory would demand that *all* should be n, since $R \times R$ gives only R qualities. In the second filial generation this happens in one family of seven children, but does not happen in two families with a total of 19 children in which 5 p's occur. The total of the three families is 21 n and 5 p. This is not Mendelism, but there is certainly a marvelous prepotency of the normal quality. In the third filial question from three $n \times n$ families all of the 16 children are n. If we had this generation only we should certainly have a right to suspect that n is truly recessive.

Consider next the records of polydactyl cats given by Poulton, 1883, in *Nature*. The fathers are not known, but Poulton says it is highly improbable that an abnormal female has ever crossed with a likewise abnormal male.



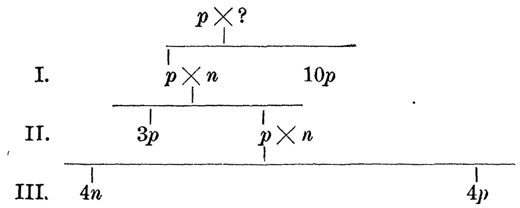
On the assumption that polydactylism (p) is dominant and the normal condition (n) is recessive, any p of unknown ancestry may be a $(D+R)$. Then the offspring of the parents $R \times (D+R)$ might give $(DR)+(RR)$ or an equal proportion of p and n. There are 4 p and 4 n in the first filial generation; thus agreeing with theory. Of the p offspring of this first filial generation one third should be pure $D+D$ and should produce only polydactyl children even with normal consorts. This condition is not realized, for both of the polydactyls of whose offspring we have a record produced both n and p offspring; but this is not surprising, considering that there are



This case is easily explained on Mendelian principles, for assuming p to be dominant and the mother in the first filial generation to have $(D+R)$ gametes, then there should be out of 10 offspring 5 p and 5 n; there are 6 p and

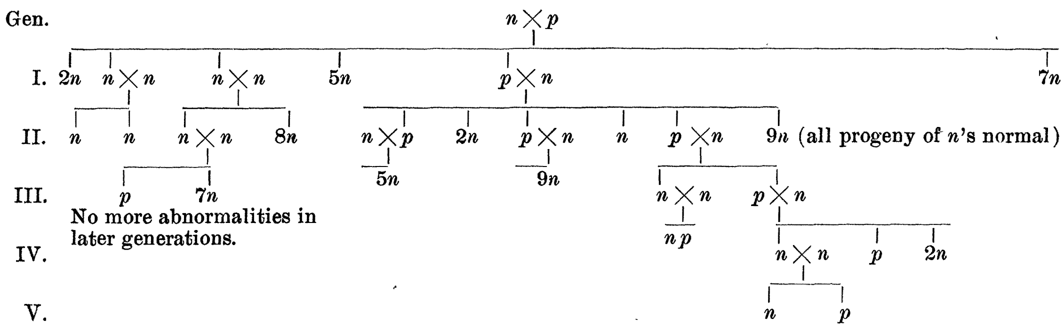
4 n. The third generation accords with the assumption that the p parent has $(D+R)$ gametes, while the p parent in the third generation behaves as would one that had purely dominant gametes. Unfortunately, the record stops here.

Struthers has given the following case of polydactylism in man:



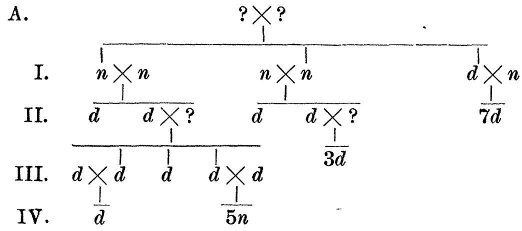
This result can be explained on the Mendelian hypothesis by considering the original parent to have only D gametes; and that the father was also polydactyl. The offspring (I.) are all p and purely dominant. In the first filial generation D is crossed with R and the dominant offspring have $(D+R)$ gametes; when one of these gametes of the second filial generation is crossed by R the product is $DR+RR$ (third generation). We should expect an equal number of dominant and recessive individuals and we get them. If, on the other hand, we calculate the proportion of abnormal individuals in accordance with Galton's Law we should get only 33 per cent. instead of the actual 50 per cent. Mendel's Law here accords with the facts better than Galton's Law.

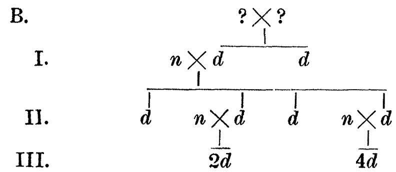
Another series is given by Struthers (1863) in the *Edinburgh New Philosophical Journal* for July. Mr. A. L., normal, married E. P., who had six fingers on the left hand. They had eighteen children, of whom one only was abnormal, with six fingers on both hands. These relations and the remaining descendants are given in the accompanying diagram.



This case differs from the preceding in the small proportion of p's occurring in any generation. These small percentages can hardly accord with Mendel's Law.

Finally, we may consider some cases of inheritance of deaf-mutism for records of which we are indebted to Bell, 1884, *Mem. National Academy of Sciences*, II., pp. 179 and 208.





It seems impossible to regard either n or d as recessive. If n is recessive how can d be derived from two n parents as in Case A, Gen. I.? If d is recessive, how can 5 n come from two d parents as in A, Gen. III.?

The conclusion of this communication is that while Mendelian principles seem applicable to some cases of crosses between sports and the normal species, there seem to be others where neither Mendel's nor Galton's Law of Inheritance holds.

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