The result is exactly the same as when a so-called 'pure' Mendelian gray mouse is obtained through a cross. The 'pure' dominant is contaminated in the same sense as the 'pure' recessive and in the same way. For example, a gray mouse crossed with a black will give a mouse $CGCB$ whose germ cells will be, on my view, $CG(CB)$ and $(CG)CB$. Such mice inbred will give

$$1\,CG(CB) + 2\,CG(CB)\;(CG)CB + 1\;(CG)CB.$$

The so-called 'pure' dominant, $CG(CB)$, is really only a dominant gray with black in the latent condition. This form is strictly comparable to the yellow mice that Cuénot tested for purity, and could not be expected to give by inbreeding a form with perfectly pure germ cells, $CGCG$. To obtain such a pure gray mouse, $CGCG$, a wild form, never crossed with black, must be sought; for, once crossed always contaminated.

The preceding results given for these special cases are strictly in accordance with what is now becoming recognized in regard to the usual condition of albino mice. It has been shown that these carry gray, or black, or some other color *latent*. Thus a white mouse is $A(G)$ or $A(B)$ or $A(Y)$. Suppose one of these white mice, with the formula $A(G)$, is crossed with a pure gray mouse, with the formula CG:

$$A(G) \times CG = A(G)CG.$$

The offspring are all gray, because free gray dominates free white. Suppose now we inbreed these $A(G)CG$ mice. Their germ cells will be, on my point of view, of two sorts, viz., $A(G)(CG)$ and $(A(G))CG$. The resulting offspring give

$$\underset{\text{White}}{1\,A(G)\,(CG)} + \underset{\text{Gray}}{2\,A(G)\,(CG)\,(A(G))\,CG} + \underset{\text{Gray}}{1\,(A(G))\,CG}.$$

Since albino is white, while C stands for the color with which it is associated, we may simplify the form of the equation by omitting the C's and putting the G's together, thus:

$$1\,A(G) + 2\,A(G)\,(A(G))\,G + 1(A(G))\,G.$$

Thus our formula gives the Mendelian results, but it also brings to light the different relation of latent (G) and free G. If individuals of the middle group above be inbred, they again give the Mendelian ratio 1:2:1; because the free A and the free G alternately dominate and become latent, so that the germ cells are $A(G)$ and $(A)G$.

It is needless to go over the well-known Mendelian combinations of other sorts, back crossing, etc., since they also work out according to our formula.

The important point is not that there is offered here a new set of Mendelian formulæ, but a new conception regarding dominance and recessiveness, which I believe to be better in accord with the conditions found to exist in extracted recessives. Furthermore, this idea brings into question the assumption of the so-called purity of the germ cells, by means of which modern writers are explaining the Mendelian results. Purity only means dominance over latency. Dominance over recessiveness follows a different rule, viz., the rule of alternation or of contrasted gametes.

T. H. MORGAN.

RECENT CHANGE OF LEVEL IN ALASKA.[1]

ABOUT the middle of September, 1899, the coast of Alaska, in the St. Elias-Fairweather region, was visited by a series of vigorous earthquake shocks, one effect of which was to greatly modify the front of the Muir glacier, and to fill Muir Inlet with ice dislodged from the glacier. The shocks were also felt with marked intensity at Yakutat, and a company of prospectors, camped near the Hubbard glacier in Disenchantment Bay, report a series of severe shocks and accompanying water waves.

[1] The observations outlined in this paper were made in the summer of 1905 in connection with a general geological survey of the Yakutat Bay region by a United States Geological Survey party under the direction of the senior author. A grant of money obtained through the assistance of the American Geographical Society made it possible to add the junior author to the party as special assistant in physiographic and glacial geology. Acknowledgments are due to B. S. Butler, the other member of the party, for assistance in this work. Published by permission of the Director of the U. S. Geological Survey.

During our work along the shores of Yakutat Bay, and its extension called Disenchantment Bay and Russell Fiord, abundant evidence was found to prove that the shores of the great fiord suffered a profound disturbance during this earthquake. The evidences of change of level are: (1) physiographic—elevated rock benches, sea caves, chasms, alluvial fans and beaches, submarine till uplifted to form shore lines, and the appearance of new reefs and islands; (2) biological—various marine forms, such as *Balanus, Mytilus* and a calcareous alga clinging to uplifted rock on which land plants now thrive, but in no case plants more than five years in age; and (3) human—the narrative of the Yakutat natives. Depression is shown by the sea encroaching on and killing trees; and extensive water waves are proved by the destruction of forests along the shores of Yakutat Bay high above the present reach of the waves.

The fiord, which is about sixty miles in length, has the form of a bent arm, starting from the Pacific as the broad Yakutat Bay. This bay is bordered by a low foreland of glacial debris on the southeast and by Malaspina glacier, with its fringe of glacial debris, on the west.

Back of the lowland fringe rises a range of mountains, really foothills of the St. Elias chain, reaching elevations of from 4,000 to 6,000 feet. The seaward face of this range rises abruptly out of the low foreland with a steep and remarkably straight front. Into this range Yakutat Bay penetrates, rapidly narrowing to the form of a fiord whose lower end is named Disenchantment Bay. At the head of this bay the fiord, thence called Russell Fiord, abruptly turns back toward the ocean and extends out beyond the steep mountain front, ending in a bay-like expansion in the fringing lowland. Three large tidal glaciers—Hubbard, Turner and Nunatak—fed among the lofty mountains of the St. Elias chain, enter the fiord.

The mountainous shores of the fiord have been differentially deformed, some parts showing no change in level, while one shore, that south of Turner glacier, has suffered elevation of from 33 to 47 feet. Accompanying this change there has evidently been faulting along some of the arms of the fiord. That this faulting has been complex is indicated by the presence, in a number of places on the land, of numerous new faults close together and parallel to each other and, in general, to the strike of the St. Elias chain. The best of these were observed on the nunatak at Nunatak glacier, where the maximum throw of single faults reached three feet, though the aggregate throw of all the faults in a given region amounted to several times this figure. The region has apparently been warped and broken into a series of blocks which are tilted in a complex relation, and which themselves have suffered extensive minor faulting. In one place, along the lower part of Russell Fiord, the faulting apparently follows a line of earlier movement.

The uplift is confined to that part of the region which lies along and inside of the steep, straight mountain front, while on the low fringe of foreland, and in the Malaspina glacier region, there is, for the most part, no evidence of any change of level excepting at the very mountain base. Locally, however, and especially near the mountain, there is depression along the shores of the lowland, reaching a maximum of from three to five feet. Professor Russell long ago assigned to this mountain front a fault origin on the basis of the form, and our observations confirm this interpretation. Moreover, there is clear evidence of a still earlier, though very recent, movement along this major fault line.

Our observations, which later will be published in full, indicate that the earthquake was the result of a great upward movement along the front of the St. Elias chain, with minor differential movements of large and small kind, together complexly fracturing the crust along and near the shores of the fiord. Along the extreme front of the mountains the uplift was from six to nine feet; but further back it locally reached a much greater figure, in one place, as previously stated, causing an uplift of the coast of 47 feet.

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