The Penycuik Experiments. By J. C. EWART. London, A. and C. Black. 1899. Pp. xciii + 177.

Experimental Contributions to the Theory of Heredity. A. Telegony. By J. C. EWART, Proc. Royal Soc., Vol. LXV. 1899. Pp. 243–251.

Guide to the Zebra Hybrids, etc., on Exhibition at the Royal Agricultural Society's Show, York. By J. C. EWART. Edinburgh, T. and A. Constable. 1900. Pp. 51.

About ten years ago there was an agitation in England for the establishment of an institution to experimentally test current theories regarding the processes of evolution. A memorial was circulated, and signed by many eminent persons, but the castle—or rather menagerie—in the air which enthusiasts had built did not descend to solid ground. In the meanwhile, however, certain individuals were laying plans of their own. Experiments in breeding moths had already yielded remarkable results. The experimental method had become fashionable, at least in theory, and it seemed that there were large possibilities before those who had time and money at their command. Under these circumstances it was, perhaps, not remarkable that Professor Ewart, aided and abetted by various friends, should have undertaken to breed equine hybrids to prove the validity or otherwise of the theory of telegony. But if the Penycuik experiments were thus a natural product of the times, they were for that reason the more timely, and all biologists may be thankful to the Scottish professor for having planned them so carefully, and carried them out so satisfactorily.

And now that we have the published results before us, what of telegony? The evidence on which it rested, at least so far as the Equidæ are concerned, is so thoroughly disposed of that it seems almost superfluous to discuss it. Professor Ewart did not start out with the proposition that telegony was absurd; and the statement that he would so prove. On the contrary, whatever he may have thought of the doctrine, he gave it every chance. He also got results similar to those which had been held to prove telegony. Mulatto, a West Highland pony, had a foal by Matopo, a Burchell's zebra. Subsequently Mulatto had a second foal by Benazrek, a gray Arab. This foal, which, except telegony be true, had no zebra blood in its veins, had a number of stripes when a few days old. A figure of it is given, and it certainly has a very zebra-like appearance. At this point a less scientific investigator might have concluded that telegony was proved, and there was nothing further to be said. Not so Professor Ewart. He continued his researches, and in due time was able not only to show that such striping as that of Mulatto's second foal was not uncommon in horses, but also to produce equally striped foals from mares which had never seen a zebra.

In the course of the investigation, many facts of the greatest interest were ascertained. The hybrid between the Highland pony and Burchell's zebra showed a striking likeness to the Somali zebra in the plan of its stripes. This is considered by Professor Ewart to indicate reversion, and in this connection excellent reasons are given for considering that the common ancestor of the various breeds of horses was striped, and that among zebras the Somali species is in many respects the most primitive.

The whole question of reversion resulting from a cross is carefully discussed, and it is suggested when there is a sort of antagonism between the immediate parents or close ancestors, the more or less remote ancestors might contribute more than their normal share to the new individual. That is to say, the two incompatible parents annihilate one another, more or less, like the Kilkenny cats, and the ancestral traits, which otherwise would be crowded to the wall, come to the front. This sounds reasonable enough, but one may hazard a further suggestion that the two parents would contribute the *same* latent ancestral characters, but *diverse* modern ones, and so the characters of their common ancestor might be emphasized. Thus, let A be the characters of the common ancestor, and B and C the characters subsequently acquired by the race represented by each parent. Then the union would be that of AB + AC, which would give A the advantage, if for any reason B and C were less than ordinarily powerful. Dr. Max Standfuss, in breeding hybrid moths (*Entomologist*, 1900, p. 341), has found that the phylogenetically oldest

species appear to be prepotent over those of more recent origin. This may be understood if we represent the union as AA + AB, both contributing the same ancestral characters, and one the same modern ones as the ancestral.

A very interesting point brought forward by Professor Ewart is, that in some cases reversion may lead to a sort of rejuvenescence. For instance, "If there are any puppies in a grossly imbred litter that take after a good ancestor several generations removed, they invariably prove the strongest and best." If there is any truth in the idea that in man physical vigor is correlated not infrequently with a certain rusticity of mind, it may be that the phenomenon is one of a similar kind.

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Geological Survey of Canada, General Index to the Reports of Progress, 1863 to 1884. By D. B. Dowling, B.A.Sc. Ottawa. 1900. Pp. 475.

In the terms of the prefatory note by Dr. G. M. Dawson, Director of the Geological Survey, "the present General Index begins with the volume of 1863 for which an entirely new index has been made, and embraces the succeeding reports to that of 1882–83–84 inclusive. It covers sixteen volumes and two short summaries, making in all 6,585 pages of text to which more than 31,000 entries are given. It thus provides a ready means of reference to practically the entire body of observations published by the Geological Survey up to the year 1884."

From 1885 to the present time, 'Annual Reports' have been issued by the Department, each of which is separately indexed. The 'General Index' just issued forms publication No. 638, of the Geological Survey and contains 475 pages of text divided into three parts, viz:

Part 1. Districts described in the several reports.

Part 2. Special Examination.

Part 3. The General Index.

These include: (1) The reports analyzed geographically and arranged under Provinces, Counties and Districts, so that under any county or district in a province, a list of references to reports, arranged in chronological order, is given. (2) Ores, rocks, minerals or fossils, that have been subjected to assay, analysis, microscopical examination, that were scientifically described. (3) The general index of which the following are the principal points: the arrangement under a reference to a place being usually chronological, while under a subject references will be found alphabetically arranged, or in case of common occurrences, as of iron, fossil, etc., localities may be grouped under provinces.

The 'Reports of Progress of the Geological Survey of Canada' and the 'Annual Reports' of the same contain a vast amount of useful and practical information on the mineral and other natural resources of the Dominion, as do also the maps which accompany these reports, giving in a graphic form the leading geological features of the territory included. This 'General Index' is therefore hailed with delight not only by all who are interested in the resources of the great Dominion as a work which gives ready reference to the various economic products in a series of volumes containing 6,585 pages of text, but also by all students in science who may desire to carry on further researches in the various districts comprised in the reports treated. The amount of time henceforth to be saved in searching for information on the thousand and one points referred to in each of the volumes indexed cannot be over-estimated, and all persons into whose hands this index falls will bless its projector as well as author. An index to all the geological maps referred to in the Reports may be found under the word 'Maps.'

Mr. Dowling's index will also be of special value for bibliographic references, as the work performed by various officers of the Geological Survey from 1866 to 1885 falls under the name of each officer; and, as the readers of the *Ottawa Naturalist* are aware, in Vol. XIV., No. 6, of that Magazine for September, 1900, Mr. Dowling gave a chronological index to the field work done by the officers of the Survey from its commencement to 1865, so that there is now available for ready reference a complete history of geological work done in Canada from 1843, the year when the Geological Survey of Can-