conclude[9] "that there is usually no metaphase, strictly speaking"

P.S.—Since writing the above I have received a paper by two of the leading authorities on this subject in the United States[11] who "have compared the chromosomal phenomena in *Datura* and *Œnothera* and have shown that segmental interchange is a possible basis of circle formation in both genera". Further, these workers have been able to determine the type of configuration that would be shown by a hybrid, from a knowledge of the pairing properties of its parents' chromosomes and the genetical properties of their characters. In four cases tested these determinations (one of them a prediction) were shown by observation to be correct.

Those who are familiar with the sterile speculations prompted by the theory of telosynapsis will notice a welcome change in the close reasoning now being profitably applied to the chromosome analysis of *Œnothera*. C. D. DARLINGTON.

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April 11.

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The Integuments of Whales.

IN whales the integuments may be supposed to serve a double or treble purpose: the outer layers—the epidermis and the pars papillaris of the dermis or cutis vera protecting the underlying parts, and the deeper—the thick and oily pars reticulata or 'blubber' preventing the loss of heat, and at the same time diminishing the specific gravity of the body and reducing its tendency to sink.

In the Greenland whale (? also in the Atlantic whale) the epidermis is thicker than in the 'fin whales', and in the Delphinapteridæ (that is, in the narwhal and white whale) it is thicker, although not to the same extent, than in other 'toothed whales'. Moreover, in the Greenland whale and in the Delphinapteridæ a pars papillaris which is tough and does not yield oil is present, a condition not met with in the 'fin whales' and in many of the 'toothed whales'.

Are the integuments thicker in the calf than in the adult? The answer appears to be in the affirmative: the epidermis in the young sperm whale is $\frac{3}{8}$ in. in thickness against $\frac{1}{8}$ in. in the adult, according to Beale, and in the calf of the Greenland whale nearly 2 in. against about half that thickness in the adult, according to Scoresby.

An epidermis 2 in. thick is remarkable, but Scoresby makes the same statement in his "Journal of a Voyage to the Greenland Sea in 1822", and in the log-book of his 1811 voyage preserved in the Whitby Museum.

In the blue fine whale (*B. Sibbaldi*) the blubber is known to be thin and imperfectly formed at birth (see Turner, *Trans. Roy. Soc. Edin.*, vol. 26). Assuming that this is also the case in the 'right whales', might not the great thickness of the epidermis in the calf of the Greenland whale be a protection against the coldness of the Arctic waters until the blubber has reached its normal character and thickness?

As mentioned in Buckland's "Notes and Jottings", p. 352, and recently by Sir Sidney Harmer (see NATURE, Feb. 22, p. 286), the 'inner skin' or pars papillaris of the narwhal and white whale were at one time used in making leather, but, so far as I know, the corresponding layer of the skin of the Greenland whale, although tough and $\frac{1}{4}$ in. thick, according to Scoresby, was never put to a similar purpose. The whalers looked on it as valueless and threw it overboard together with the thick 'black-skin' or epidermis attached to it. Not so the Eskimo; they held it in high esteem as an article of diet. 'Maktuk', the Eskimo name for the rejected part of the whale's integument, is, according to Low ("Cruise of the *Neptune*", p. 261), usually eaten boiled: "when cooked it has the appearance of thick black india-rubber and is soft and gelatinous while its flavour approaches that of the clam". The corresponding parts of the narwhal and white whale were cooked and eaten in the same way. ROBERT W. GRAY.

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April 21.

Search for an Inactive Isotope of the Element 84 (Polonium).

THE elements 81 (thallium), 82 (lead), and 83 (bismuth) have both radioactive and inactive isotopes, whereas the elements 84-92 are only known in an active form. Several attempts have been made to find inactive isotopes of the latter elements. Aston, using his mass spectrograph, tried to discover a stable isotope of radon in the atmosphere, and Hahn made extensive researches to find an inactive isotope of radium. All these attempts failed.

We have recently tried to extend the series of inactive elements by searching for an inactive isotope of the element 84 (polonium), which follows bismuth. Through the work of the discoverer of this element, Mme. Curie, and her co-workers, as well as of Marckwald and of many others the chemical properties of polonium were found to be intermediate between those of bismuth and tellurium. Hence it is obvious that if a stable isotope exists, it must be associated in Nature with tellurium or bismuth.

We looked for the elements 84, therefore, in the following tellurium and bismuth minerals: Hessite, calaverite, nagyagite, tetradymite, and bismuth glance as well as native bismuth. The minerals were dissolved, and a known amount of polonium added as radioactive indicator. On removal of the polonium from the solution, it was to be assumed that any isotope present in the solution would accompany the active polonium. By special methods devised for the purpose, it was possible to regain the added polonium electrolytically on molybdenum electrodes, the deposit weighing only about 1/10 mgm. X-ray investigations, carried out by the secondary ray method to avoid the possible volatilisation of the substance under the action of the cathode rays, have shown that the deposit cannot contain more than 1/2 per mille of the element looked for. The X-ray line searched for was polonium La_1, the wave-length of which was calculated from Moseley's law to be 1111 X.U. All the lines on the plate could be identified as belonging to lead, bismuth, silver, mercury, or tungsten. As we started with about 400 grams of each of the minerals mentioned, 1 gm. of each mineral cannot contain more than 10^{-7} gm. of the element in question. This negative result is in agreement with generalisations arrived at by Dr. A. S. Russell.

There is thus very little hope of finding an inactive polonium isotope, or of extending the series of radioactive elements which now exists beyond 83 (bismuth).

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