of the Permo-Carboniferous and other pre-Pleistocene glacial epochs, but to claim, as Prof. MacBride does, that "drift into high latitudes affords a complete explanation of all glacial phenomena previous to the Pleistocene" is surely to propose a too facile solution for a highly complicated group of problems which further information can alone clarify.

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July 28.

[1] NATURE, 142, 97-99 (July 16, 1938).

IN answer to the criticisms of the Rev. W. L. S. Fleming, I have frankly to admit two foolish mistakes in nomenclature. For "Ross Sea" read "Weddell Sea," and the height of land from which the Beardmore Glacier takes its origin is of course a few projecting peaks which are *not* Erebus and Terror.

The mistakes in nomenclature leave my argument quite unaffected: indeed, since then I have measured on *The Times* map the actual breadth of the ice-shelf. If, as Dr. Stephenson assures me, the Beardmore Glacier is 200 miles long, the breadth of ice-shelf to be added is 1,200 miles. This gives 1,400 miles as the length of the ice-flow, and nothing in the Pleistocene ice-flows approached this.

With regard to the fossils from the rocks beneath the ice-sheet, I thought that all knowledge of these was gathered from the erratics which Scott brought back. I am delighted to learn that Jurassic strata are exposed in one place and that these show no signs of glaciation. It is of course conceivable that, while one part of Gondwanaland escaped Gondwana glaciation, another part did not do so—but this is not a likely supposition.

My conception of the Gondwana ice-age is as follows. In Permo-Carboniferous times there was one huge southern continent, lying in temperate regions to the north and east of the South Pole. In this continent there was a characteristic flora which enables portions of it to be recognized wherever they are.

In Permo-Carboniferous times it drifted southward over the pole. At that time Australia and Antarctica lay at its northern edge. As the drift continued, both Australia and Antarctica broke off and remained in the temperate zone. The rest of the continent as it reached the pole underwent severe glaciation, after which in Cretaceous times it broke into three great fragments, namely, South America, South Africa, the Deccan of India, in all of which traces of this ice-age can be seen. Sir Thomas Holland has said that these traces can be detected in portions of the north of India, so far did the drift go on. At a later period the same drift affected Antarctica and led, as I said, to its present condition.

Mr. Fleming, while agreeing generally with the theory of continental drift, says that it is a rash thing to make it account for all the ice-ages. It certainly does not account for the Pleistocene ice-age, as I said. But besides the Pleistocene there are only two well-authenticated ice-ages in the history of the earth, the Pre-Cambrian and the Gondwana. So far as I can find out, there are no traces of the Pre-Cambrian ice-age in the southern hemisphere. Beds supposed to belong to this ice-age in India have been recently shown to be relics of the Gondwana ice-age.

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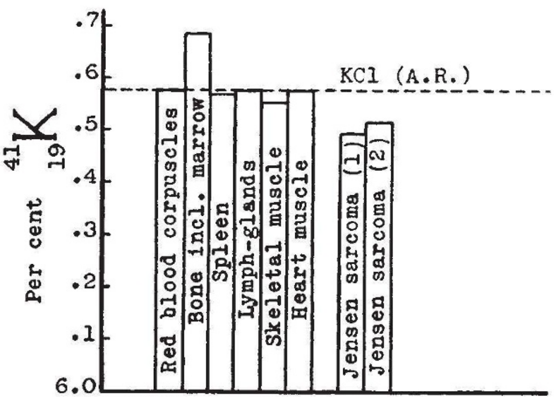
Isotopic Constitution of Potassium in Normal and Tumour Tissue

WITH the idea that the isotopic constitution of potassium contained in tumour tissue might be somewhat different from that present in normal tissue, comparative investigations in this field have been undertaken. The abundance ratio ${}^{39}_{19}K/{}^{41}_{19}K$, and thereby, practically, the concentration of the heavy isotope ${}^{41}_{19}K$, was estimated in potassium present in the ashes of various kinds of normal and tumour tissue, the measurements being carried out by means of a mass-spectrograph previously described in detail[1,2].

A selection of the results so far obtained is illustrated in the accompanying figure, showing the percentage of ${}^{41}_{19}K$ in potassium contained in Jensen rat sarcoma and in some normal rat tissues of mesodermal and mesochymal origin, including red blood corpuscles. It will be seen that the content of ${}^{41}_{19}K$ in potassium present in red blood corpuscles, as



CONCENTRATION OF ${}^{41}_{19}K$ IN POTASSIUM CONTAINED IN JENSEN RAT SARCOMA AND SOME NORMAL RAT TISSUES.

well as in spleen, lymph-glands and heart muscle, was the same as, or very close to, that in mineral potassium contained in ordinary potassium chloride (A.R.). In contrast the ${}^{41}_{19}K$ content in potassium present in bone, including marrow, showed an increase by about 1·7 per cent. This deviation was probably due to the marrow alone and confirmed similar results previously obtained with marrow from other animal species[2]. The ${}^{41}_{19}K$ content in potassium from skeletal muscle showed a doubtful decrease of about 0·4 per cent. Ashes for these determinations were prepared from mixed tissues taken from an equal number of males and females. The average animal weight, corresponding to each tissue, was between 210 gm. and 225 gm.

In comparison with the above results it was found that the relative ${}^{41}_{19}K$ content in Jensen rat sarcoma was distinctly low. Two samples of ash from tumours obtained by subcutaneous inoculation are here considered. The tumours constituting sample (1) had an average weight of about 15 gm. and were taken, 18 days after inoculation, from animals having an average weight similar to those considered above; the tumours constituting sample (2) had an average weight of about 14 gm. and were taken, 14 days after inoculation, from animals having a much lower average weight. The potassium in sample (1) contained about 1·3 per cent and that in sample (2)