My thanks are due to Prof. H. Raistrick, Mr. George Smith and Dr. Harry Coke for much help and advice.

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March 17.

Potable Water from Sea-Water

I was surprised that in his article on "Potable Water from Sea-Water" Dr. A. Parker[1] makes no reference to what seems to a biologist an obvious method—that found in the Bowman's capsule of the kidney. If a pressure greater than the osmotic pressure is applied to a solution bounded by a semi-permeable membrane, pure solvent will go through the membrane. The osmotic pressure of sea-water is about 450 lb./sq. in., a pressure reached over an area of 1 sq. in. by quite small car jacks with no more effort than can be applied with one finger. The only difficulty should be the semi-permeable membrane, and I suggest that research might profitably be devoted to producing a suitable one. It would not need to be perfect; if it let through 15 per cent of the salts, a two-stage pump would produce a liquid within the limit suggested by Dr. Parker for potability.

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[1] Nature, **149**, 184 (1942).

It was not possible in my relatively short article to mention all the methods, which have been suggested, for obtaining drinking water from sea-water. The intention was only to indicate the main principles of the methods.

Suggestions of the kind mentioned by Mr. Yapp have been considered. If a method involving the use of a semi-permeable membrane as a filter under pressure is to be suitable for use under conditions similar to those in open boats, it must meet the following requirements: It must be simple to operate. The membrane must be so robust or so supported that there is little or no risk of the membrane being broken or perforated during transport and use. The rate of passage of the drinking water through the membrane must be reasonably high, say about one pint an hour. It is also desirable in the particular circumstances that the treated water should not contain more than about 100 parts of salt in 100,000 parts; this means the removal of at least 97 per cent of the salt in sea-water.

Ultra-fine membranes of the collodion type under pressures of the order of 250 lb. per square inch have been used in experiments for the Water Pollution Research Board for the removal of bacteria from liquids and for the separation of finely dispersed colloids from saline solution. Experience has shown that although the rate of filtration is very slow, salts such as sodium chloride readily pass through these membranes. It may be that intensive investigation would lead to the discovery of a membrane satisfying the requirements, but the problem presents so many difficulties that the prospects of solving it within a short time are not great.

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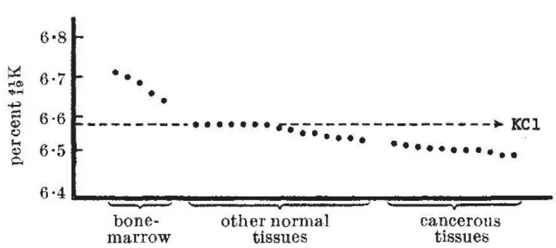
An Isotopic Shift of Potassium in Human Bone-marrow and Cancer

In previous investigations it has been found that the isotopic constitution of potassium contained in bone-marrow and tumour tissue from the rat was appreciably different from that of potassium in various other normal rat tissues, the shift observed with 'bone-marrow potassium' being opposite to that observed with 'tumour potassium'. As regards potassium in normal tissues other than bone-marrow, the content of the heavy isotope, $^{41}_{19}K$, usually proved to be very close to that of mineral potassium as contained in ordinary potassium chloride (A.R.); only in a few exceptional cases was the $^{41}_{19}K$ content slightly decreased[1,3]. However, with potassium in bone-marrow (that is, bone including marrow), a marked and regular increase in the content of $^{41}_{19}K$ was obtained; on an average, the increase was 1·9 per cent[1,3] This result agreed with earlier findings on potassium in bone-marrow from horse and beef[4]. A similar shift was further obtained with potassium present in rat blood plasma[2,3]. On the other hand, potassium in Jensen rat sarcoma showed a distinct decrease of its $^{41}_{19}K$ content, and a similar result was found with potassium in mouse sarcoma 37*S*. The average decrease for both tumours was 1·1 per cent[1,5].

It was of interest to carry out similar investigations on potassium contained in human tissues. This has been done, so far, with postmortem material, taken as a rule twenty-four hours after death. A number of normal tissues ('non-cancerous' tissues in a stricter sense) were tested; they included five samples of bone-marrow, taken from lumbar vertebræ, and fifteen samples from liver, kidney, lung, spleen, brain, heart and skeletal muscle. All the samples were derived from organs which showed, on macroscopical examination, little or no pathological changes. Further tests were made with various kinds of cancerous tissue, consisting of eight samples of primary carcinomas which originated from liver, kidney, lung, stomach, colon and rectum, and of three samples of secondary carcinomas (metastases) of the liver. The preparation of ashes and the technique of mass-spectrographic analysis were similar to those previously described[3,6].



Content of $^{41}_{19}K$ in potassium present in certain tissues from humans.

Dotted line indicates content of $^{41}_{19}K$ in mineral potassium as contained in potassium chloride, A.R.

The results are illustrated in the accompanying figure. Each recorded point indicates the percentage of $^{41}_{19}K$ in potassium contained in one ash sample; the whole of the values is arranged in a descending order of magnitude, independently of the tissues concerned. It will be seen that there are five values which are above the level represented by the $^{41}_{19}K$ content of mineral potassium; the increase is, on an