gested in various parts of the world, and made recommendation for further study. To produce final evidence is, however, a most complicated matter, since cancer increases in frequency with age, so that it will be necessary to have detailed knowledge on the age distribution of the normal population as well as of the cancer patients before final conclusions can be drawn.

The International Cancer Research Commission has established a committee on geographical pathology which endeavours to promote endemiological studies on cancer in various parts of the world. In July this year a symposium met in Louvain for the discussion of the endemiology of cancer of the lung (*Lancet*, 1952, **2**, 581), and the committee is assisting the International Society for Geographical Pathology in the preparations for a world-wide review of cancer frequency and mortality to be made at a conference in Washington, 1954. It would seem that this field of investigation will deserve far more attention by research than has been given to it in the past by the various bodies set up for research in cancer. It has to be realized that as long as factors causing cancer are described as "geographical" this means that our knowledge of their nature is entirely unsatisfactory. Attention should certainly be paid to observations like those published by Mr. Legon, even if the explanation of the variation may have to be sought in quite unexpected fields of study.—I am, etc.,

JOHANNES CLEMMESEN,
Director of the Danish Cancer Registry.

Biochemical Normals in Healthy Africans

SIR,—Africans often consume an inadequate diet, and parasitic diseases and disorders and the infections which are linked with unfavourable environmental and social conditions are common enough. It is not surprising, therefore, that various abnormalities are encountered among these people—in the biochemistry of the blood protein picture, in liver function tests, in carbohydrate metabolism, in the excretion of ketosteroids, and so forth. The question naturally arises, What are these abnormalities due to? So many factors could be involved—for example, racial differences; acute episodes of unsatisfactory feeding (for example, at weaning time); chronic undernutrition and malnutrition; habituation to a high cereal diet very low in animal protein; chronic malaria, schistosomiasis, or ankylostomiasis; syphilis, tuberculosis, etc. All too often several of these possible influencing factors are present simultaneously—a state of affairs rendering it very difficult to investigate the role of any one of them. There is thus a serious lack of biochemical data on Africans accustomed from birth to a satisfactory diet, and who have been, and are, free from infestations and infections. It is possible, of course, to collect ample information on Africans fed a satisfactory diet for a limited number of years, and Bantu nurses, for example, are being studied at a local non-European hospital; nevertheless, uncertainty of their nutrition in infancy, childhood, and youth, and of the incidence of parasitic and other diseases occurring during this period, precludes them from supplying the fundamental data so urgently required.

With this problem in mind, we have recently visited a small, very isolated group of villages at Tsane, in the heart of the Kalahari Desert, about 300 miles (482.7 km.) north-west of Mafeking, and there we think that we have located an African population which may well provide us with the information in question. Every household owns cattle, goats, and sometimes poultry; in addition, there is plenty of game—springbok, wildebeest, etc.—which is trapped or shot. A good supply of meat, and usually a fair supply of milk, are thus available. Sufficient maize, kaffir corn, and beans are grown to satisfy requirements, at least in seasons of normal rainfall. For vegetables there is tsama, a species of wild melon that is extensively cultivated and eaten both fresh and dried. From the diet consumed it is understandable that the clinical state of the people, particularly the young, was found to be excellent. Furthermore, examination of samples of blood smears, sera, throat swabs, sputa, urine, and faeces provided no evidence of current or, in certain respects, of past infestations and infections. Although these people would appear to be almost ideal for furnishing the biochemical data required, it must be admitted that the rainfall is unreliable, and that droughts cause occasional shortages of certain foodstuffs. There is, however, an African police post at Tsane, the members of which, in addition to receiving their pay, are able to run their kraals and small farms; it is considered that the standard of the diet of such families is likely to be affected little or possibly not at all from seasonal shortages. This would also apply to the families of the larger cattle owners, of whom there are several.

It is our hope to return to the area and by careful inquiry and examination to select subjects (1) that have been very probably habituated to a good diet, and (2) that have lived in the region throughout their lives and thus have probably not suffered from, nor are suffering from, the infestations and infections so very common to Africans elsewhere. We are sanguine, therefore, of obtaining data of the type enumerated above, at least for children and young adults. Such knowledge should allow a start to be made in the assessment of the possible factors influencing the abnormalities listed at the beginning of this letter.

Our initial expedition was made possible by the South African Council for Scientific and Industrial Research, the South African Institute for Medical Research, and the medical authorities of Bechuanaland Protectorate, to whom we are deeply indebted, and with whose permission this letter is published.—We are, etc.,

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B. T. SQUIRES.

Johannesburg.

Kwashiorkor in Ibadan

SIR,—During the past four years a large number of cases of kwashiorkor have been seen in Ibadan, Nigeria, and, although conforming to the general picture as painted by the Makerere team (October 11, p. 791 *et seq.*), the following points may be of interest.

Kwashiorkor is called by various names by the Yoruba people, and one of the commonest is "ela" or "licking," referring to the skin rash, which is thought to be due to worms in the body licking off the skin from within. Mild or "latent" kwashiorkor, associated with failure to gain weight, apathy, etc., is well recognized as a dangerous, though common, phase of growth in infancy. It is known as "owowe" or "falling (of the leaves)," which refers to the well-known sparseness of the hair.

The age distribution in Ibadan is fairly similar to that in Uganda. In 1950, of 44 cases treated, 64% occurred between the ages of 18 and 36 months. They did, however, appear to differ in that many were still not completely weaned from the breast when the disease developed, although it seems unlikely that they were receiving more than very little breast milk. In Ibadan, kwashiorkor is commonly found, at least in older infants, in association with infective gangrene of the mouth (cancrum oris), which may itself have a nutritional basis.

The less spectacular skin lesions remarked by the Makerere team were also common in Nigerian cases (that is, deep bleeding fissures behind the ears, etc.; grey circular "slumbering" ulcers). As regards the now classical "crazy pavement" rash, I agree that the emphasis should be, at least in severe cases, on the fact that it consists of a "raw" desquamation—large fine hyper-pigmented flakes peeling to leave a weeping, or at least very thin and pale, underlying skin. In Ibadan, as was noted by Brock and Autret, it is common for this rash to involve the whole body surface.

One cannot help wondering whether the roundworm should not have been mentioned in the discussion on the role of parasites in kwashiorkor. Some 90% or more of children in Ibadan are infected, and, as many hundreds of worms may be present in a single child, interference with protein absorption seems highly probable.—I am, etc.,

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