

5 (8%) of the instruments, and these were all of American manufacture, were found to be above reasonable criticism. The criterion was efficiency in sterilization with minimal damage to the load. Some examples of the more common or interesting faults in design or installation were as follows: lacking automatic air and condensate discharge from floor of chamber, 41 (63%); pressure in jacket sufficiently in excess of that in chamber to cause serious superheating, 11 (17%); lacking thermometer, 55 (85%); steam introduced at bottom of chamber under the perforated tray, 40 (63%); connexion between floor of chamber and main water supply of hospital, 11 (17%); connexion between chamber and underground drains (definitely no air break), 3 (4%); connexion between underground drains and main water supply of hospital via chamber, 2 (3%). In 16 hospital laboratories and pharmacies in the same area 32 hot-air ovens were examined; none had fans or turbo-blowers. Of the 26 main autoclaves (without vacuum attachment) used in the 16 units, only one withstood really searching criticism.

The report by the Central Pathology Committee of the Ministry of Health on the sterilization of hospital equipment, issued to hospitals on December 31, 1954, countenances this condition of affairs and goes even so far as to give directions concerning the operation of obsolete and demonstrably ineffective steam pressure apparatus to the total exclusion of efficient design. If perpetration of past faults sanctioned by this retrogressive report leads to criticism and thence to correction or replacement by the Ministry of inefficient sterilizing apparatus in hospitals, this official publication would, in retrospect, become justifiable.—I am, etc.,

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### Aetiology of Kwashiorkor

SIR,—The very interesting and significant case of kwashiorkor occurring in a breast-fed infant of three months of age described by Dr. L. G. MacDougall (*Journal*, November 13, 1954, p. 1150) raises again the question of aetiology of this syndrome. The difficulty in reconciling this and other cases of kwashiorkor seen in adequately breast-fed infants<sup>1,2</sup> with the common view that kwashiorkor is due to a deficiency of animal protein (or of some constituent(s) thereof) led to the introduction of another assumption—namely, that in such cases the mother's milk may be deficient in an essential factor.<sup>3</sup> There is no evidence, however, to support this assumption.

It seems surprising that so little attention has been devoted to another concept—namely, to the possibility that it is not the *absence*, but rather the *presence*, of some factor(s) which is the cause of kwashiorkor. This concept has been suggested on the basis of experimental studies with senecio alkaloids in young rats.<sup>4,5</sup> These hepatotoxic pyrrolizidine alkaloids are known to be present in certain plants of the botanical families Compositae, Boraginaceae, and Leguminosae,<sup>6</sup> many of which are being used as traditional herbal medicines by the African negroes and in other under-developed countries.<sup>7,8</sup> Interesting examples of herbal treatment of mothers and infants have been recently published from Ibadan<sup>9</sup> and from Tanganyika.<sup>10</sup> These authors, however, do not specify the exact composition of the complex concoctions used as drinks, bathing fluids, or porridge admixtures. These probably vary depending on the region, the season, and the availability of the plants. The point of great importance would be to ascertain the constituents of the particular herbal mixtures which have been used in kwashiorkor cases by the mothers during pregnancy or lactation, as well as those given to the babies.

The following points relevant in such an inquiry may be worth recalling: (1) The alkaloid content of plants varies with the season. In young plants pyrrolizidine alkaloids are present mainly in the form of N-oxides which, being more palatable, are likely to be ingested in larger quantities, and induce various degrees of poisoning. (2) The action of the alkaloids in doses not immediately toxic may manifest itself only after an induction period of several

weeks or months or even years. (3) Treatment with the alkaloids of females during pregnancy may affect the foetus *in utero*. (4) The alkaloids induce similar effects regardless of the route of their application, whether by feeding or to the skin. (5) Young animals in the course of rapid growth are more susceptible than adults to the action of these alkaloids. Gastro-intestinal disorders, pancreatic and splenic changes, stunted growth, haemorrhage, anaemia, respiratory disorders, and liver damage (necrosis, fatty infiltration, fibrosis, hyperplasia, and neoplasia) have occurred in response to appropriate treatment with the alkaloids. However, even litter mates show a great variability in response to the same treatment; while some may remain unaffected in good health, other siblings may succumb at various stages of the pathological chain of events. (6) The effects of these alkaloids manifest themselves in animals given an adequate diet, but are aggravated if superimposed on dietary protein deficiency.—I am, etc.,

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### Operator and Anaesthetist

SIR,—I am somewhat perturbed that the letters which have appeared in the *Journal* on this subject may be used to establish a legal precedent. Surely it is time that this subject was considered from a common-sense point of view. Ideally all dental anaesthetics should be administered by specialist anaesthetists, either with medical or dental qualifications who have had special experience in dental work. However, such men are scarce, and outside London and one or two other centres they do not exist, even if the average patient could afford the fees that such men rightly command.

It is, and has been for the last 25 years, a common practice among dental surgeons to act as operator-anaesthetist when dealing with emergency extractions. They are usually helped by well-trained chairside assistants. This practice, far from being negligent, is safer and more efficient than getting the average general medical practitioner to give the anaesthetic, and is the only economic possibility under the N.H.S. scale of fees. I have been concerned in three anaesthetic deaths. At two I was a spectator, and I arrived at the third shortly after the tragedy had occurred. In each of these cases the anaesthetic was administered by a medical practitioner—one a specialist anaesthetist.

The average medical practitioner has never been taught to give dental anaesthetics. For many years I worked in the dental department of a teaching hospital, and I can count on the fingers of one hand the occasions when medical students visited the department for instruction in dental anaesthesia. Similar conditions exist in most medical schools. It is unreasonable to assume that most medical men trained under these conditions will give efficient dental anaesthetics without special training. In domiciliary midwifery no objection is raised when a medical practitioner induces anaesthesia and then hands over to the midwife while he continues the work of delivery. This, however, is a much more dangerous procedure than that carried out by the dental operator-anaesthetist, who is working on the airway all the time and can readily observe any abnormality of respiration.

These are the facts, and apply as much to thiopentone as to nitrous oxide, provided the dentist has had experience in administering the former. There are occasions when it is safer for the dental operator-anaesthetist to give thiopentone in preference to nitrous oxide.

As to getting a certificate in every emergency case from the patient's own doctor, this is impracticable, whatever a "learned judge" may have laid down. If carried to its logical conclusion, no anaesthetics should be given in the casualty department of a