awoke and vomited. Prochlorperazine 10 mg was given intramuscularly, which relieved her temporarily. By 5 a.m. she appeared delirious and respirations were 36, pulse 96, and blood pressure 150/90. Venous blood drawn at 7 a.m. revealed sodium 132 mEq/l., potassium 5.6 mEq/l., chloride 89 mEq/l., carbon dioxide content 4.0 mEq/l, pH 6.97, PCO_2 15.6 mm Hg, and lactic acid 246 mg/100 ml. In spite of infusion of fluids containing dextrose and sodium bicarbonate, therapy with digoxin and hydrocortisone, she died at 5 p.m. Necropsy revealed severe pulmonary oedema and moderate, bilateral chronic pyelonephritis.

The patient had been receiving three grammes daily of tetracycline for 10 days and phenformin 100 mg daily for seven days, when suddenly a catastrophic episode intervened under observation in the hospital. Although spontaneous lactic acidosis occurs in diabetics not on phenformin, the frequency of case reports of lactic acidosis in patients on phenformin has prompted suggestions of a causal relationship. Tetracycline may have played a role in this patient by increasing the blood levels of phenformin through its catabolic effects in a patient with impaired renal function.—I am, etc.,

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Ganglion Cysts of Bones

SIR,—In discussing ganglion cysts of bones you state that the pathogenesis of ganglia is obscure (13 November, p. 380).

In 1938 Wilson, Eyre-Brook, and Francis¹ suggested that semimembranous bursae (which contain ganglion-like fluid) might become distended by reason of a valve-like opening into the knee joint. A similar aetiology for ganglia seemed likely but, as you rightly point out, defects in the joint capsule are difficult to substantiate by dissection and injection of ganglia with radio-opaque material fails to show a communication with the joint.²

However, failure to demonstrate flow from ganglion to joint is just what one would expect with a valve-like mechanism; what is needed is evidence of one way flow from joint to ganglion. This has now been convincingly demonstrated by Andrén and Eiken,³ who have been able to show communication between the wrist and adjacent ganglia in 37 out of 59 cases investigated by injecting radio-opaque fluid into the wrist joint under pressure.

There are strong theoretical arguments in favour of ganglia being "blow outs" through valve-like openings in joint capsules and tendon sheaths. They occur in characteristic anatomical sites, they are aggravated by movements and relieved by rest, they recur if excised without operating on the valve opening, and they often exhibit remarkable ramifications and burrow into tendons, nerves, and bones.

For many years I have operated successfully on ganglia on the basis of a valve aetiology. Cure can be always obtained by either closing the opening into the capsule or tendon sheath or, if this cannot be demonstrated, by excising the area of capsule underlying the ganglion. In suitable cases I am now taking this treatment to its logical conclusion by leaving the ganglia in situ and

operating only on the valve mechanism.—I am, etc.,

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¹ Wilson, P. D., Eyre-Brook, A. L., and Francis, J. D., *The Journal of Bone and Joint Surgery*, 1938, 20, 963.

² McEvedy, B. V., *British Journal of Surgery*, 1962, 49, 585.

³ Andrén, L., and Eiken, O., *The Journal of Bone and Joint Surgery*, 1971, 53-A, 299.

Submandibular Gland and Lingual Nerve

SIR,—The necessity for identification of the lingual nerve is a leitmotif in descriptions of removal of the submandibular gland in textbooks of operative surgery. That this particularly applies to removal of the gland for calculi is obvious from the facts of the anatomy of the lesion, the two sites at which calculi calling for the operation impact being at the hilum of the gland as it lies on the hyoglossus just below the lingual nerve, and in the posterior part of the extra-glandular duct at or close to the point at which it is crossed by the lingual nerve. The nerve is 3-4 mm wide, and only rarely are adhesions so dense as to render its identification unduly difficult. In recent years, however, the idea has obtained a certain currency in Britain that it is unnecessary to identify the lingual nerve if the gland is being removed for calculi. The object of this letter is to emphasize that this is a dangerous and mistaken idea, and to try to trace how it has arisen.

Its proximate source would appear to be a misinterpretation of an account of the operation in Farquharson's *Textbook of Operative Surgery*,¹ a popular work among candidates for the final Fellowship. A short paragraph describing the operation terminates with the sentence: "Related to the deep surface of the gland, between it and the hyoglossus, are the hypoglossal and lingual nerves; these should be identified and safeguarded." This is clear and categorical, but the next paragraph continues: "In inflammatory and calculous disease, only the superficial part of the gland requires to be removed. In malignant disease the deep part of the gland extending forwards between the mylohyoid and hyoglossus should be dissected out and included in the excision."

This latter paragraph is an almost literal transposition of a similar paragraph in the first edition of Aird's *A Companion to Surgical Studies*,² which seems to be the original source. The paragraph is capable of being misinterpreted in two ways. The first is in relation to the word "superficial." The "superficial part of the submandibular gland" as anatomically defined is the whole of the gland with the exception of the small portion running forwards deep to the mylohyoid, which is anatomically defined as "the deep part." In both Aird and Farquharson such anatomical details as are given make it clear that they are using the terms as anatomically defined, and that they are not advising a blind cutting through the substance of the superficial part. Again, careful reading of the paragraph in which the warning on the lingual nerve occurs makes it obvious that it is removal of only the anatomical superficial part which is being described, no mention of the deep part being made or implied.

I am writing to the late Mr. Farquharson's

publishers suggesting that in the next edition the pseudo-qualifying paragraph in question should be omitted. Quite apart from its potentialities for misinterpretation, it is on the one hand unsound on the treatment of calculi, and on the other irrelevant to the realities of malignant disease. Exposure, and preferably also removal, of the deep part of the gland is necessary to deal adequately with calculi impacted in the posterior part of the extra-glandular duct, and is desirable, because of the increased access thus provided, for calculi impacted at the hilum of the gland.

In the treatment of the rare malignant disease of the submandibular gland, preservation of the lingual nerve becomes of secondary importance. In fact, since the commonest variety primarily affecting the gland is adenoid cystic carcinoma which has a predilection for spreading along nerve sheaths, resection of the nerve may actually be indicated.—I am, etc.,

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¹ Farquharson, E. L., *Textbook of Operative Surgery*, 4th edn. Edinburgh, Livingstone, 1969, p. 408.

² Aird, I., *A Companion to Surgical Studies*. Edinburgh, Livingstone, 1949, p. 255.

Antileprosy Drugs

SIR,—May I comment on the letters of my good friends, Dr. A. S. Garrett (30 October, p. 300), and Dr. W. H. Jopling (6 November, p. 366) regarding the occurrence of psychosis in leprosy patients under treatment with dapsone? As so frequently happens, when two knowledgeable and sincere persons disagree, both may be right.

It is undeniable that despite social pressures and attitudes, and despite the emotional shock occasioned by the diagnosis of leprosy, psychotic manifestations were quite rare in the developing countries in the pre-sulphone days among leprosy patients undergoing treatment in institutions or at rural dispensaries with the pure hydnocarpus or chaulmoogra oil or their derivatives or esters (iodized or not), or with such salts as sodium gynocardate. It is also true that the widespread use of dapsone at daily doses of 300 or 200 mg (as advocated by Lowe and others), was accompanied by a high incidence of dose-related toxic phenomena in the skin (notably exfoliative dermatitis) and other organs, and of acute psychotic episodes. When, in the earlier '50's, the dose of dapsone in general use was reduced to 100 mg a day, the frequency of acute psychosis diminished. These observations were made in several countries, and in typically rural areas where patients were not taking other drugs or confined in institutions.

A very small proportion of patients, probably less than 1 in 1,000, under treatment for leprosy with even lower doses of dapsone, suffer from insomnia, delusions, and hallucinations, sometimes with manic or suicidal tendencies. When dapsone is stopped the mental state slowly returns to normal. If dapsone is given again—even in very small doses—the psychotic symptoms recur; if a placebo of similar appearance is given, nothing happens.

The 12 leprosy patients reported by Jopling¹ as having mental disturbances (including six who "developed signs of frank schizophrenia, requiring admission to a mental hospital") among 125 admissions to