come by introducing the element of infiltration; unfortunately for this view, in leather-bottle stomach with almost universal infiltration pain is at a minimum. The rigid fibrosis of carcinoma precludes the distension essential to the genesis of muscular visceral pain. Again the accompanying inflammatory cellulitis provides the explanation—recession or removal of the infective factor in stomach cancer by oral cleansing, gastric lavage, short circuit, etc., mitigates or relieves the pain entirely (incidentally also, as is too little known, the achylia). Hence the paradoxes that a man's best help in getting an early diagnosis of carcinoma of the stomach is to have a filthy mouth, and conversely, that in the edentulous carcinoma of the stomach is peculiarly latent. Pathology is one and indivisible, the most potent cause of fluctuations in symptoms throughout clinical medicine is the ebb and flow of inflammatory oedema.

But now Mr. Kinsella introduces the question of pain and haematemesis. Is this a Greek gift or a very subtle emphasis of the case I have outlined? Haemorrhage from "peptic" ulceration may be a slow trickle (the basis of the occult blood test) from the circum-ulcerous inflamed mucosa—gastroscopists will agree the origin is not granulation tissue in the ulcer floor—or brisk, or severe. Brisk, always recoverable, bleedings occur from erosions (the old "acute" ulcers), occurring indiscriminately as regards site. They are small, heal rapidly, and are never followed by chronic ulcer. They involve only the mucous and submucous coats, opening comparatively small vessels, and not holding them open and non-retractable by chronic fibrosis and oedema, and uncommonly involve the gastric musculature. In these erosions pain is but a transient, often absent, feature.

In chronic ulceration brisk haemorrhage may arise from erosions in concomitant gastritis (with clinical features as in the preceding instance), or from the opening of large extramural vessels by an exacerbation of devitalization and digestion. Rigidity of the surroundings prevents "natural" arrest of bleeding. Pain precedes and accompanies the bleeding, and its persistence indicates progression of necrosis and inflammatory reaction. Traditionally such cases have been treated by either complete prohibition of intake or merely sips of water—such a regime leads quickly to a total cessation of gastric function, motor or secretory. Hence the age-old fasting treatment gives as rapid a recession of ulcer symptoms as any of the most elaborate drug and diet treatments, particularly if stimulation of gastric peristalsis by iced water and the epigastric ice-bag is precluded. In fine, the treatment of haemorrhage is that best calculated to diminish ulcer symptoms; persistence of pain, as noted in the Goulstonian Lecture, is of bad prognosis, indicating despite such treatment an extension of the ulceration. That the clot in the floor of the ulcer prevents the deadly HCl from getting at and stinging the ulcer is most difficult to believe from any *a priori* chemical consideration; muscular atony from acute anaemia of haemorrhage is at least a credible accessory factor.

The haemorrhage-pain clinical features of ulceration offer therefore no contradiction but rather a substantiation of the cellulitis-myogenous view of gastric pain in ulcer and carcinoma. My original letter was a challenge to the radiologists in their claim to demonstrate healing of "peptic" ulcers; with them must now be included the physicians in the indictment that they fail to correlate morbid anatomy with the signs and symptoms of gastric disease.—I am, etc.,

London, W.1.

C. JENNINGS MARSHALL.

Oral Intubation and the Davis Gag

SIR,—I must thank Dr. I. W. Magill (Feb. 28, p. 417) for his observation on the tongue plate for the Boyle-Davis gag, which I described in the *Journal* of Feb. 7 (p. 267)—needless to say I claim no originality for the device, the principles of which must have occurred to every E.N.T. surgeon. I cannot agree, however, that intubation is not advisable for tonsil operations, though it is far from essential. As he admits that it is suitable for the more difficult and lengthy operation of cleft palate, however, I cannot see why it is not, to say the least, preferable for even short cases. After all it is a simple matter to put in a tube, and the increased safety and control of anaesthesia (on both patient and surgeon) are surely adequate compensation for cutting the hourly production rate in children down to five or six dissections.

He puts emphasis on the ability of the surgeon and the anaesthetist. Is the anaesthetist justified in assuming that the surgeon is "capable," by which I presume he means the operation is relatively rapid and avascular? These are optimum conditions—I feel it is safer policy to prepare for the worst.—I am, etc.,

Darlington.

J. S. C. MONRO.

The Danger of Intubation under Trichlorethylene

SIR,—Dr. Gordon Ostlere has recently published two articles in the *Journal* concerning the use of trichlorethylene (April 5, 1947, p. 448, and Jan. 31, p. 195). The first dealt chiefly with the use of curare in "poor-risk patients." It certainly confirmed my own belief and experience in the wide range and usefulness of trichlorethylene especially when used in combination with curare for such cases. In the second article the toxic effects as shown by cardiac arrhythmias are mentioned and Dr. Ostlere points out that trichlorethylene should not be used in the presence of an existing cardiac irregularity, and that it should be replaced by ether where an irregularity occurs and persists with trichlorethylene.

Several fatalities have occurred when this drug has been used, but one cannot always blame the drug directly—in fact it is probably safer to lay the blame in most cases partly to the technique used and/or partly to some concealed or unobserved condition of the patient which may even have been unassessable. I am unable to present any technical details regarding recorded fatalities with this drug, but I would like to mention two cases in my own experience.

Case 1.—A man aged 49—poor colour and rather wasted—was suffering from right renal calculus. B.P. 160/100. Blood urea normal. Left kidney normal. Heart and lungs, n.a.d. It was proposed to perform a right nephrectomy. "Omnopon," gr. 1/3 (22 mg.), and scopolamine, gr. 1/150 (0.43 mg.), were given and he arrived in the theatre more than usually drowsy. 0.4 g. thiopentone was then administered followed by gas-oxygen and trichlorethylene. Respiration soon answered to carbon dioxide stimulation and blind intubation performed at the first attempt. There was immediate reflex spasm and breath-holding, the breath being held at the expiration of a pronounced cough. In an attempt to relieve the spasm I administered curare 15 mg. and oxygen under pressure. I hoped that the incision might prove a stimulus to the respiratory centre, but almost immediately after the incision had been made the heart ceased to beat. Remedial measures were instituted and the heart eventually restarted by massage by an incision through the diaphragm. Voluntary respiration returned very slowly and then more rapidly, changing later to Cheyne-Stokes respiration. He was then removed to the ward and transferred to an "iron lung," being taken out at intervals. Always there was a return to Cheyne-Stokes respiration. He died thirty-six hours after the incision without regaining consciousness. Post-mortem examination showed marked atheroma of aorta and a hypertensive thick-walled heart. The coronary arteries were pipestem in character and so narrowed by atheroma that their lumina were invisible. The cerebral arteries were of similar calibre. Death was therefore due to cardiac failure as a result of the coronary atheroma and essential hypertension.

There is little doubt that this patient had not long in this world, but I feel he would have died more peacefully and in his home had a deeper plane of anaesthesia been used for the period of intubation.

Case 2.—A well-built young man, over 6 feet tall, was to have a gland excised in his neck. Exactly the same induction technique was used. Breath-holding occurred following intubation, but the pulse remained full and regular. Here I felt it was justifiable to administer curare. I gave him 10 mg. curare, but this time kept the patient in the anaesthetizing room. A gradual relaxation of spasm occurred and a return to normal respiration so that the operation was continued successfully under gas-oxygen and trichlorethylene.

These two cases I think emphasize sufficiently the danger of intubating some patients under too light an anaesthetic, and such cases should be brought out into the open.

Some anaesthetists advise using a cocaine spray before all cases requiring intubation. I would say this is unnecessary as a routine and only serves to upset a number of patients. Some prefer to intubate whenever possible through the mouth. Where relaxation is not required and the patient is well built and possesses a full upper and lower set of teeth the nasal route is often to be preferred. And finally a discussion in this journal has recently been taking place concerning the technique of Dr. Bourne, of intubating under almost maximum doses of thiopentone and curare.

We have therefore two extremes—very light, and very deep. In view of possible dangers I consider it unsafe to make intubation under trichlorethylene a routine technique unless the larynx has been well cocaineized. Rather would I suggest that laryngoscopy should be performed and a tube introduced under cyclopropane or ether, and then possibly a change made to trichlorethylene as soon as the curare has been given or the patient has settled

down in a suitable "plane." For direct nasal intubation when relaxation is not required I consider that ether should be used to subdue the laryngeal reflex. If this is contraindicated, as in a toxic thyroid, heavier premedication and a systematic spraying with cocaine should be carried out.

Although we may be fully aware of the great value of both trichlorethylene and curare we should be careful lest we mis-abuse them by going to extremes with both—that is to use trichlorethylene where the laryngeal and other reflexes are not subdued, and to use curare to take the patient far beyond the plane necessary for the immediate process of intubation. This of course in no way infers that trichlorethylene is not an otherwise excellent agent when administered, following a thiopentone induction, with an abundance of oxygen using the semi-closed method with a facepiece, for a wide range of cases which do not provoke strong reflex disturbances in the respiratory and cardiac centres. An injection of atropine or scopolamine should always precede a trichlorethylene administration.—I am, etc.,

Bristol.

W. M. MAIDLOW.

Trichlorethylene in General Anaesthesia

SIR,—Although fully appreciative of Dr. Gordon Ostlere's review of the position of trichlorethylene in general anaesthesia (Jan. 31, p. 195), I do not believe that the role of this agent has been fully evaluated as yet, nor the signs of anaesthesia obtained with it fully explained. The somewhat meagre literature on this subject always appears remarkably restrained and undecisive, and I should like to make a few personal observations.

It seems certain that trichlorethylene can be a most useful addition to the armamentarium of the anaesthetist provided that it is used with care and judgment. It is also true to say that it can, when improperly used, produce many unpleasant, embarrassing, and even menacing side-effects. Trichlorethylene, in any concentration, has some effect on respiratory function. In low concentration this effect is minimal and need cause no disturbance to patient, surgeon, or anaesthetist. With higher concentrations several effects may be produced. Tachypnoea is commonly the first sign, the respirations being shallow as well as frequent. This may lead to the appearance of cyanosis, or actual respiratory arrest may occur. It has been stated that this increased respiratory rate is due to a direct sensitization of the pulmonary inflator and deflator receptors. The impulses are said to pass by way of the vagus nerves, and the giving of atropine in full dosage before the administration of trichlorethylene may, on theoretical grounds alone, render marked tachypnoea less likely to occur. Another explanation to be considered is that the lung bases become filled with the heavy and relatively non-volatile vapour of trichlorethylene, thus reducing the available lung capacity and leading to anoxic anoxaemia. The respiratory rate and depth is also influenced by the nature and severity of the surgical stimuli, as with all anaesthetics when used in the lighter planes of anaesthesia.

The characteristic and comparatively well-defined signs of anaesthesia attendant on an ether anaesthesia are notably lacking or confused when trichlorethylene is used. The pupils are inconstant in size and show frequent changes during the administration, although a dilated pupil is suspicious of overdosage. The eyeball is usually more or less mobile, tending to fix slightly off the central position. Slight twitching movements of the eyelids and face muscles are seen occasionally, and athetoid movements of the fingers are not uncommon. It seems that the effect of trichlorethylene on muscle tone has not yet been fully elucidated. That it has a definite tendency to produce an increase in tone, which may be the cause of the above effects, including that of the eyeball muscles, is possible.

I observed the following disturbing phenomenon recently. A healthy young adult male was undergoing operation for hydrocele. Induction of anaesthesia was by means of 17 ml. of 5% soluble thiopentone solution and maintenance was by gas-oxygen (80:20%) supplemented by trichlorethylene. On mobilization of the testis convulsive diaphragmatic movements started, and these continued at intervals, separated by a series of about four normal respirations. These jerky-abdominal movements would be described as "hiccups" in the conscious subject and they continued for about 15 minutes, during which time all attempts to abolish them failed completely. The trichlorethylene was cut out of circuit and ether was added, without result. The oxygen was increased to 35%, and 5% carbon

dioxide was added for a few breaths, again without apparent effect. The "hiccup" finally ceased after the inhalation of about a dozen breaths of air at the conclusion of the operation. It is probable that this picture was produced by the action of reflexes from the site of operation, these reflexes not being obtunded during a smooth trichlorethylene anaesthesia. This operation is, no doubt, one of many where trichlorethylene as an anaesthetic is *not* indicated.

Cardiac arrhythmias occurring during trichlorethylene anaesthesia consist usually of extrasystoles which may progress to pulsus bigeminus as with cyclopropane. These usually disappear on lowering the anaesthetic concentration and seldom cause further anxiety. The vapour of trichlorethylene is slightly irritant and may cause coughing or laryngeal stridor if increased too rapidly, although these effects are rare in comparison with those seen with ether. The pharyngeal and laryngeal reflexes are obtunded quickly, and a pharyngeal airway is tolerated early.

Cases suitable for trichlorethylene anaesthesia must be selected carefully and premedicated sufficiently at the proper time. The fact must be faced that trichlorethylene cannot replace ether in any case where deep narcosis is necessary or where any degree of true muscular relaxation is desirable. The concentrations of trichlorethylene necessary for the induction of surgical anaesthesia are very much higher than those required for maintenance, as Dr. Ostlere states, and these high concentrations are frequently the cause of the side-effects which rightly incite suspicion in the mind of the administrator as to the safety of this agent.

Trichlorethylene finds a place in modern anaesthetic practice as an agent for maintaining surgical anaesthesia induced by another agent, preferably thiopentone. It is doubtful if it finds an equal place in the induction and maintenance of surgical anaesthesia per se. The administration of trichlorethylene for maintenance is different from that of ether in that a much closer watch must be kept on the patient for signs of overdosage, and the amount of trichlorethylene must be kept down to the absolute minimum.

It seems that the best results are obtained when gas-oxygen-trichlorethylene is used for maintenance following a thiopentone induction. In these cases the respirations frequently remain shallow and only slightly increased in rate, and the anaesthetic concentration can be kept minimal. The pushing of trichlorethylene results in rapid, shallow breathing with jerky diaphragmatic movement and noisy "blowing" respirations, perhaps accompanied by laryngeal stridor, cardiac arrhythmias, and cyanosis with dilated pupils. This picture is not one of smooth anaesthesia and it is rarely, if ever, seen when trichlorethylene is used following induction to surgical anaesthetic depth with thiopentone. It is desirable to give sufficient thiopentone to produce satisfactory surgical anaesthesia for the particular operation before maintaining the anaesthesia with gas-oxygen-trichlorethylene. In this way all the advantages of trichlorethylene anaesthesia are obtainable without the side-effects attendant on the high concentrations necessary for both induction and maintenance of anaesthesia by this agent alone.

I believe that the pharmacology and clinical uses of trichlorethylene will bear further investigation, but such investigation must be accompanied by clinical impressions from as many sources as possible. It is with this object in view that I note the above observations.—I am, etc.,

Huddersfield.

RONALD A. MILLAR.

POINTS FROM LETTERS

Some Modifications

DR. EMRYS D. OWEN (Neath, Glam.) writes: Failure to solve the present position will discredit both parties and cause a severe loss to the medical profession. I suggest that the present planks in the B.M.A. platform be abandoned and the following substituted: (1) To establish the chance of a successful appeal to the courts the conditions under which a complaint against a doctor could be presented to the Local Executive Committee and Tribunal should be rigidly delineated. The regulations governing the conduct of both patient and doctor should be strictly codified by a committee of practitioners. These would exclude any possible victimization on political grounds. Dismissal from the Service should give the doctor an automatic right to one year's income in lieu of notice (see precedent recently in another service). As a corollary a doctor should be expected to give one year's notice of retirement, during which he could have a say in the election of his successor and introduce him to the practice. (2) Basic salary: the present offer should be accepted, but the successor to the panel conference should be formed into a trade union within the B.M.A. necessitating a special annual subscription ready to defend our position, using a modified strike weapon such as refusal of certificates if necessary. (3) Claim the right to elect a proportion of medical members of all