bleeding point was found. She recovered. There was no mention of toxæmia of pregnancy in this case.

In the absence of high blood pressure and arteriosclerosis the heart is incapable of raising the blood pressure sufficiently high to cause rupture of a normal artery, and some congenital or developmental defect must precede spontaneous rupture. Bruce (1937) suggested that the haemorrhage in this group may be due to rupture of a miliary aneurysm or a "junctional area." Bruce's suggestion was soon confirmed by Schuster (1937), who described a case of multiple aneurysms of the splenic artery which she believed were of congenital or developmental origin in a case of familial haemorrhage telangiectasis. Shallow, Herbut, and Wagner (1946) demonstrated defects in the muscle coat of the inferior pancreaticoduodenal artery associated with a ruptured congenital saccular aneurysm at the first bifurcation and three small fusiform dilatations in the more distal parts.

At post mortem it is often difficult to demonstrate the bleeding point in this type of massive spontaneous intraperitoneal haemorrhage. However, careful dissection of the affected part and sectioning of the neighbouring vessel will demonstrate the cause—a ruptured miliary aneurysm or congenital defect of the arterial wall.—We are, etc.,

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Cancer of the Lung

SIR,—With reference to recent correspondence I wish to draw your attention to the fact that in a small research (confined to males) carried out here it was found that the incidence of cancer of the lung fell more heavily on smokers than non-smokers—correction for age having been made. Unfortunately the number of cases investigated was too small to be statistically significant.

Our ignorance of the fundamental cause or causes of cancer is almost completely unrelieved. We know that in a small proportion of cases the inciting cause is the repeated application of a carcinogenic agent contained in tar, soot, oil, or other substance. The apparent increase in cancer has been almost entirely in cancers of inaccessible parts of the body.

Improved methods of diagnosis—of which radiology is the chief—are accountable in part for the greater frequency with which a diagnosis of cancer of the lung is now made. Also it is possible that more people develop cancer of the lung because more people live to the age at which cancer usually occurs. Gassing during the first world war and its sequelae apparently did not predispose to lung cancer.

Whether tars or other agents contained in tobacco act as carcinogenic agents in the lung is a disputed question. A complete statistical survey of smokers and non-smokers on this point has yet to be made. The quality and amount of tobacco consumed, the frequency of inhalation, age, sex, race, and all other relevant factors would have to be included in such an investigation.—I am, etc.,

Public Health Department, Halifax.

G. C. F. ROE.

Intervertebral Disk Lesions

SIR,—Dr. Michael Kelly (Feb. 28, p. 416) rightly draws attention to the well-known observation that pain is not a characteristic feature of lesions known to produce pressure on nerve trunks. As was shown by Lewis and Pochin,¹ in nerve paralysis from pressure touch fails early, motor power next, "fast" pain later, and delayed pain last. Before pain sensation is lost transitory hyperalgesia may occur, so that the earliest signs of nerve pressure are alternating periods of numbness and cutaneous tingling in the area of distribution. Pain such as that of the sciatic syndrome does not occur.

On page 424 of the same issue, however, your adviser's reply under "Any Questions?" follows traditional thought in suggesting that the sciatic pain of disk lesions is due to pressure or stretching of nerve-roots. That may be so, but there is at least some evidence that other factors are involved. Kellgren and Lewis² demonstrated that irritation of a deep somatic structure such as an interspinous ligament by injection of hypertonic

saline resulted in pain throughout the corresponding sclerotome with accompanying muscle spasm. We can aver from personal experience and self-experiment that the pain produced by so stimulating the fifth lumbar interspinous ligament is clinically and subjectively indistinguishable from that occurring spontaneously in an L5-S1 disk lesion.

Now, primarily, herniation of the nucleus pulposus is a joint lesion which produces strains on surrounding ligamentous structures and may finally give rise to nerve-root or spinal compression. Such a joint disorder might reasonably be expected to produce pain throughout the corresponding sclerotome, *irrespective of whether or not nerve pressure occurs*. In fact, a large proportion of patients in whom the diagnosis is subsequently confirmed by operation never present any acceptable objective evidence of nerve pressure such as muscle weakness, anaesthesia, or loss of deep reflexes.

Before the phenomena are clearly understood two facts must be explained. (1) Application of a short plaster corset, even without preliminary extension, may rapidly relieve pain, although the area of anaesthesia persists or, as in one case under our observation, actually increases. Clearly such benefit cannot be due to relief from nerve pressure, but it may well be the result of immobilizing, at least partly, the grossly deranged spinal joint and thereby diminishing the deep segmental pain arising therefrom. (2) We have found that in many cases of undoubted disk prolapse temporary relief from pain follows injection of the corresponding interspinous ligament with 1% procaine solution. This cannot be the result of relief from nerve pressure though the change may be explicable upon the basis of the theory recently propounded by Cohen.³

The understanding of the pain mechanisms involved in these cases is a matter of some importance. In most instances the primary necessity of treatment is the relief from pain, a problem as yet incompletely solved. Fuller understanding of the manner in which pain is produced will surely pave the way to more universally satisfactory results.

It is generally accepted that on clinical evidence alone the level of a lumbar spine disk lesion cannot be confidently predicted. It may be that the present conception of sciatic pain as the result of root compression is responsible for this difficulty, and if it were regarded as a deep segmental pain due to joint disturbance this difficulty might be resolved. Over-simplified views of the pain mechanism in this condition are liable to follow a mechanical interpretation of the functions of the central nervous system.

The problem is a complex one and, clearly, many questions remain to be answered. We are at present engaged in an investigation of this subject and hope to communicate our findings in due course.—We are, etc.,

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- ¹ *Clin. Sci.*, 1938, 3, 141.
² *Ibid.*, 1939, 4, 47.
³ *Lancet*, 1947, 2, 933.

The Extent of Neurosis

SIR,—Stimulated by the correspondence on this subject I decided to classify the patients I saw during a period of twelve weeks—from Nov. 9, 1947, to Jan. 31, 1948. Some of the facts and figures emerging may be of interest. The practice under review is a large mixed private and panel practice in a town of some 25,000 inhabitants, extending also to some of the neighbouring villages. It is run by four partners, who share the work as equally as possible, apart from the fact that nearly all the anaesthetics are done by one partner, and a very large proportion of the midwifery by another. This accounts for the rather disproportionately small showing of these two types of work in the figures following, since the work is that of one partner out of the four.

A total of 3,200 patients were seen; of these 1,744 were surgery attendances, 1,074 were visits to patients in their own homes, and 382 to patients in the local cottage hospital. 2,241 were "old patients," while 959 were first attendances.

Among the acts of service were included: minor surgery, 43; injections, 82; anaesthetics, 3; obstetric attendances, 43 (including 16 antenatal and 4 post-natal examinations); life insurance, 6; examination for entrance to Civil Service, etc., 10.

Not included in the total of acts of service above was the dispensing of medicine on 656 occasions and the making of 50 telephone calls on behalf of patients. Furthermore, the paper work in the course of this period, apart from record-keeping, included the writing of 1,034 prescriptions and the issuing of 879 certificates of various kinds, as well as the notifying of 21 cases of infectious

disease and the writing of 82 letters to consultants and hospitals concerning patients.

In all 70 patients were referred for a second opinion and 13 sent to hospital direct, as immediate emergencies. Of the visits, 16 were night-calls between 10 p.m. and 8 a.m.

An attempt has been made to classify the types of illness from which the patients were suffering, though it speedily became obvious that such a classification could, at best, be only a very rough one and that while certain categories could be clearly defined others tended to overlap considerably. A classification by systems of the body was also undertaken. The results are shown in tabular form below, excluding all midwifery.

Illnesses		Systems of the Body	
Acute general infections ..	25.8%	Cardiovascular system ..	9%
Acute local infections ..	12.7%	Respiratory tract ..	23.5%
Chronic infections ..	3.1%	Digestive tract ..	14.8%
Traumatic conditions ..	7.7%	Skin ..	10.5%
Degenerative conditions ..	13.9%	Bones and joints ..	7%
Constitutional diseases ..	23.2%	Muscles ..	4.1%
Organic nervous disease ..	2%	Central nervous system (in-	9.4%
Functional nervous illness ..	6.3%	cluding functional nervous	
Neoplasms ..	1%	disorders)	
Allergic conditions ..	1.6%	Genito-urinary system ..	5.3%
Fibrositis and allied states ..	2.7%	Glands of internal secretion ..	1.5%
		Connective tissues ..	3%
		Eyes ..	1.9%
		Ears ..	2.5%
		Throat ..	6.7%
		Haemopoietic system ..	0.5%

In respect of the original object of the survey—the estimation of the amount of neurotic illness—it rapidly became clear that quite apart from the clear-cut cases of almost pure neurosis a very large number of the patients suffering from a definite organic complaint were also affected by a strong subjective element, due to their anxiety about their health or anxiety about the effect of their illness on their economic conditions. In the table above the figure given for functional nervous disease of 6.3% tells only a part of the tale, as no patients with any demonstrable organic condition were included.

It seems obvious that the amount of neurotic illness seen by the general practitioner is very considerable, but that no reliable figure can be given inasmuch as standards of classification are almost impossible to set up, and the recognition of neurosis will in itself tend to vary with the outlook and temperament of the doctor himself.—I am, etc.,

Aldershot.

H. BOLTON TIPLER.

True Hermaphroditism

SIR,—Dr. A. P. Cawadias (Jan. 31, p. 229) would appear to be under some misunderstanding concerning the nature of hermaphroditism in the animal kingdom. Even the humble hermaphrodite worm might turn at being described as a "double animal." In reply to Dr. J. R. Edisbury (Dec. 27, 1947, p. 1056) it must be said that the whole subject is a very large one and it cannot be dismissed in a few lines.

As is well known, the sex of an animal depends primarily upon its genetic constitution—i.e., the sex-chromosomes when these are known to exist. But for the full development of a functioning sexual animal the whole hormonal apparatus is essential. Hormones and other conditions, however, can override the original sex chromosomes and cause a sex-reversal.

A definition of terms might not be out of place here. There are three groups:

1. True permanent *hermaphrodites*, in which ovary and testis remain together and function throughout life—e.g., earthworm;
2. *Sex reversals* in which the animal starts as one sex and passes through a hermaphrodite stage to the other sex—e.g., the Buff Orpington hen (see below);
3. Those individuals with the gonads and sexual apparatus of one sex and some or all of the accessory organs and hence characters of the other sex—e.g., the *mammalian intersexes*.

Unisexuality is the primitive condition, and not hermaphroditism, as Dr. Cawadias suggests. For example, in the invertebrates it is the more specialized forms in any groups which exhibit this phenomenon, or where it occurs in a whole group this is entirely specialized. In the *Crustacea* the sessile barnacles are hermaphrodite and also many parasites. In general the phenomenon has evolved under conditions where fertilization would be difficult if unisexuality prevailed. It is not confined to such types, as is shown by the few vertebrate hermaphrodites such as the bony fish

Serranus, where a testis is present in the wall of the ovary and self-fertilization takes place. These are all examples of Group 1 above.

Group 2 is illustrated by the now famous Buff Orpington hen which, after a blameless life of egg-laying and chick-rearing, at the age of 3½ years stopped laying, grew cock feathers, started crowing, and was successfully mated with a previously infertile Buff Orpington hen. At necropsy the ovary was found to be replaced by tumour tissue and a small amount of testicular tissue was present in the ovary. This tissue had produced the viable sperm and incidentally the secondary sexual characters. This same effect may be produced by outside agents. The crustacean parasite *Sacculina* is able to convert a male crab into one with female characters. It has been shown that in doing so it is able to use the products of the "female" crab's metabolism for its own ends.

In the case of the worm *Bonnellia*, Baltzer (1925) has shown that sex is determined by pure accident of situation. The larva at a certain stage sinks from the surface. If it falls near the proboscis of a female *Bonnellia* it becomes a male. If however it falls anywhere away from this influence it becomes a female. It has been shown that the female proboscis possesses a chemical substance which dominates the sexual character of the form which comes into contact with it.

Under Group 3 come all those cases in mammals, including man, which although predominantly of one sex do nevertheless exhibit certain characters of the other sex. In the case of cattle a co-twin to a male becomes a freemartin—i.e., a female which never becomes a functional one. This has been shown to be due to the earlier elaboration of the male sex hormones by the male twin *in utero* (Lillie, 1917).

In all higher vertebrates both male and female ducts are present during development. In most cases one develops more rapidly than the other and only vestiges of the opposite sex are left. This is not, however, always so, and in some cases, in which one may postulate a time factor, much more of the organs of the other sex develops, and even the gonad may do so. Hence the possibility of intersexes. These commonly occur in goats and pigs. In mice they are less common, and it may be suggested that here the sex-determining mechanism is more stable.

Goldschmidt (1931) in his work on moths has obtained evidence for the existence of "strong" and "weak" male and female genes. In his elaborate experiments he was able to breed types with varying grades of "maleness" and "femaleness." His theory suggests that sex and intersexuality are largely determined by a balance or lack of balance in the strength of these male and female genes. Whether this is applicable to vertebrates we do not know, but it may well be so.

Dr. Edisbury and others interested might consult any of the following books for a full account of this very large subject: Goldschmidt, R., *The Mechanism and Physiology of Sex Determination* (Methuen, 1923); Darlington, C. D., *Recent Advances in Cytology* (Churchill, 1937); Crew, F. A. E., *Sex Determination* (Methuen, 1933); Baker, J. R., *Sex in Man and in Animals* (Methuen, 1926).—I am, etc.,

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SIR,—I am indebted to Dr. A. P. Cawadias (Jan. 31, p. 229) for his informative iconoclasm and also for directing my attention to his *Hermaphroditos*, which I regret to say I have not yet read. In extenuation, your annotator (Nov. 22, 1947, p. 828) seems to have been in the same lamentable position.

There does not seem any immediate prospect of a convenient qualitative test for human y chromosomes, or a roughly quantitative test for x, either of which would reveal the true or genetic sex. Perhaps someone who knows just what possibilities exist, if any, will write an article on the subject, not forgetting the forensic aspects—e.g., male heirs, etc.—I am, etc.,

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J. R. EDISBURY.

Homoeopathy

SIR,—My attention has just been drawn to Dr. D. W. Winnicott's letter (Feb. 14, p. 313) in which he states among other things that "homoeopathy has not been accepted by the profession on scientific grounds."

As a member of the profession who practises homoeopathy, may I point out to Dr. Winnicott that homoeopathy has never-