need expert advice, with secretarial and financial assistance. Time spent on consultation increases steadily, and it is thought that time could be saved by bringing some patients to us by special transport arrangements.

Plans are advanced towards setting up a high-frequency radio link between the centre, doctors, and midwives. The suggestion has been made that doctors working from health centres should be salaried. We have no wish for this, and seek to retain our independence. Finally I am sure that this centre must remain an experimental venture, and also that there must be pooling of knowledge on the design and administration of health centres to aid their future development in this country.

STUDENT HEALTH

Hospital Admissions among Students during a Three-year Period

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Brit. med. J., 1967, 3, 674-676

A recent leading article in the *British Medical Journal* (1967) discussed the special arrangements needed for the management of psychological problems among university students. It also contained the following comment about their physical health: "He [the student of 30 years ago] suffered from influenza, the occasional inflamed appendix, and athletic injuries . . . The incidence of these physical maladies has altered little." In other words, students are to be regarded as a comparatively healthy group exempt from serious illness or disability. How true is this?

Reference has been made to the prevalence of chronic illness and to the special problems of handicapped students who, as a result of a more enlightened educational approach, are reaching university in increasing numbers (Grant, 1960). In a report of the Expert Committee on University Health Services (W.H.O., 1966) the suggestion is made that, in fact, a "wide range of acute and chronic medical and surgical disorders is seen." A brief study of the reasons for admission to hospital among students attending the University of Newcastle upon Tyne during a three-year period (September 1963 to August 1966) certainly lends support to this view.

Sources and Nature of Information

Shortly after its inception in 1963 arrangements were made for the university health service to be notified of the admission of students to the main teaching hospital in the area. Initial information about admission to other hospitals was obtained from medical certificates accounting for absence from studies, copies of which were sent to the health service by the university administration. Information came also from tutors and the wardens of halls of residence who were concerned about the implications of absence through illness or injury, which in some instances had occasioned admission to hospital either in the student's home town or elsewhere.

Clinical information was obtained in a number of ways. As the period covered by the inquiry progressed, an increasing number of students were registered with the university health service general practice, and reports about hospital admissions among them were received in the usual way, but in a number of instances follow-up inquiries had to be initiated as a result

Summary

An attempt is made at an objective criticism of the Medical Centre at Hythe. Some suggestions are included regarding possible planning for future health centres, particularly in relation to reception and office arrangements.

The main advantages of health centre practice are the availability to the patient of his or her own doctor and easy access to consultant advice and diagnostic aid.

The centre encourages the concept of a medical team in general practice. Together with a neighbouring group practice centre the area now has an integrated medical service.

of information received from one or other of the sources mentioned in the foregoing paragraph. Sufficient diagnostic information was invariably available for purposes of simple classification.

It is inevitable that a survey of this kind should be incomplete. In particular, information about admissions during university vacations is likely to have been defective, though knowledge of admissions during term will have been more reliable.

Results and Discussion

Student numbers (postgraduates included) varied somewhat from year to year during the three years under review, with a mean annual figure of 4,610. Approximately one-quarter of the students were women.

During the three years 213 men were admitted to hospital on 229 occasions for the investigation or treatment of 215 different conditions, and 120 women were admitted on 129 occasions for 124 conditions. Altogether, therefore, 333 students were admitted on 358 occasions for 339 conditions. There was little annual variation in the proportions admitted, and a reasonable interpretation of the findings would be to say that annual admission rates were between 2 and 3% of the total population at risk, with, as might be expected, a somewhat higher proportion of women admitted than men. Analysis of causes of admission into broad categories according to the *International Classification of Diseases* is given in the Table. In some instances diagnostic descriptions have been adapted or modified for the sake of brevity. Because of the small numbers in some of the subgroups, the findings in the sexes have been combined. Much of the Table is self-explanatory, but five of the items call for special comment.

Group V

Mental, psychoneurotic, and personality disorders predominated as a cause of admission. (In fact, 36 men were admitted on 47 occasions and 24 women on 28.) The difficulties of psychiatric diagnosis among late adolescents and young adults are well known, and though the neat classification given in the Table may not be entirely accurate it reflects the spectrum of psychological disorders among students and underlines the importance of adequate facilities for dealing with them. The majority of students are, of course, living away from home,

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sometimes in flats or bed-sitters, or in other circumstances where it is unreasonable to expect to find anyone prepared to exercise the care and responsibility these cases demand; and admission to hospital may be essential to the preservation of group morale even when a disturbed student is living in a university residence. Social reasons which would not necessarily be operative in a family setting may therefore contribute towards an inflation of admission rates considerably above the level expected among members of a similar age group in the community at large.

It is of interest that, of the 60 students admitted, 24 (40%) were women. Admission for mental breakdown also occurred disproportionately among foreign students. Approximately 8% of the total student population were from overseas. None of the women students admitted with mental illness were expatriates, but seven of the men—that is, one-fifth of the men

admitted—came from abroad. The findings as regards women and foreign students in respect of mental illness are in agreement with those reported elsewhere (Kidd, 1965; Maclay, 1967).

Group I

Overseas students also contributed disproportionately to the admissions for infectious and parasitic diseases. Apart from conditions obviously of tropical origin—for example, filariasis—five of the six cases of tuberculosis occurred in foreign students, who altogether accounted for one-third of the admissions in this group. These findings demonstrate the need for special screening of overseas students either before or as soon as possible after their arrival.

Group XI

It will be noted that 32 women were admitted for “deliveries and complications of pregnancy and the puerperium,” comprising a quarter of the total admissions among women students. The findings relate only to cases admitted to hospital and known to the university health service. It may well be that during the early formative period of the work of the service, while students were developing confidence in it, some preferred to take such problems elsewhere. Moreover, a number of pregnancies which occurred during the last year of the inquiry had not gone to term by the end of it and are consequently excluded. Pregnancy rates based on the figures in the Table would therefore be misleadingly low. Working in a well-established university health department, Finlay (1965, 1966), who has made a special study of the problem, estimates that between 2 and 3% of unmarried women students become pregnant each year. Not all the pregnancies enumerated in the Table occurred in unmarried students, but accumulating experience at Newcastle supports Finlay's observations.

There is no doubt that problems of personal relationships, marriage, and child-bearing are occurring with increasing frequency in university health practice. It is important to get them into perspective, however. Hitchens and James (1965), using data derived from the Registrar General for England and Wales relating to 1961, gives rates for extramaritally conceived maternities—that is, illegitimate maternities plus those occurring within nine months of marriage—per 1,000 unmarried women at risk. For the age groups 15–19 and 20–24 these were 27.3 and 63.3 per 1,000 respectively. Since an unknown proportion of pregnancies—variously estimated at between 12 and 20% (Macnaughton, 1966)—end in abortion, the rates for extramaritally conceived maternities must be a good deal lower than the pregnancy rates. Assuming an annual pregnancy rate among unmarried women students (age range, say, 18–25) to be currently of the order of 3%, there is little evidence to support the view that they suffer this particular consequence of sexual misbehaviour or misadventure disproportionately by comparison with other women of similar age.

Group XVII

Serious injury among students, often resulting in prolonged absence, and, especially in cases of head injury, sometimes presenting the most difficult problems of rehabilitation, was most commonly caused by road traffic accidents. Among less serious injuries (multiple lacerations, contusions, concussion, etc.) sometimes requiring only overnight admission, again the road traffic accident and—a sinister social commentary—the unprovoked assault figured more prominently than athletic injuries.

Deaths

Lastly, there is the “melancholy list of deaths” (Paget, 1869) given at the foot of the Table. This refers only to deaths

Three Years' Hospital Admissions. Analysis by "Final Diagnosis" According to International Classification of Disease (Sexes Combined). (Numbers of Cases in Parentheses)*

	Admissions	
	No.	%
(I) <i>Infectious and Parasitic Diseases</i> Respiratory tuberculosis (2), tuberculosis (other) (4), hydatid (1), paratyphoid (1), filariasis (2), glandular fever, infectious hepatitis, other virus diseases (10) ..	22	6.2
(II) <i>Neoplasms</i> Malignant: Melanoma (1), reticulosarcoma (1), leuk- aemia (1), Hodgkin's (2). Benign: Including pilonidal sinus (6)—(18)	23	6.4
(III) <i>Allergic, Endocrine, Metabolic, and Nutritional</i> Asthma (status) (1), thyrotoxicosis (partial thyroidec- tomy) (1)	2	0.6
(IV) <i>Diseases of Blood and Blood-forming Organs</i> Anaemia of unspecified type	1	0.3
(V) <i>Mental, Psychoneurotic, and Personality Disorders</i> Schizophrenia, including paranoid reaction (16), manic depressive reaction (2), neurotic depressive reaction (17), anxiety reaction (8), hysterical reaction, including anorexia nervosa (2), obsessive compulsive reaction (1), personality disorder (10), alcoholism (1), drug addiction (1), drug intoxication (2)	75	20.9
(VI) <i>Diseases of Nervous System and Special Sense Organs</i> Subarachnoid haemorrhage (1), epilepsy (1), keratitis (1), glaucoma (2), strabismus (1)	6	1.7
(VII) <i>Diseases of Circulatory System</i> Malignant hypertension (1), haemorrhoidectomy (4) ..	5	1.4
(VIII) <i>Diseases of Respiratory System</i> Acute bronchitis (3), spontaneous pneumothorax (3), bronchiectasis, including lobectomy (2), pneumonia (2), tonsillectomy (9), chronic sinusitis, deflected nasal septum, etc. (7)	27	7.5
(IX) <i>Diseases of Digestive System</i> Disorders of occlusion, eruptions, etc., of teeth (chiefly admission for extractions of 3rd molars under endo- tracheal anaesthesia) Duodenal ulcer (2), appendicectomy (23), hernia (2), ulcerative colitis (3), refashioning of ileostomy (1), fibrocystic disease (1), observation appendicitis (5), other (5)	36 43	10.1 12.0
(X) <i>Diseases of Genitourinary System</i> Infections of kidney (2), hydrocele (3), other (3), phimo- sis (1), gynaecomastia (2), disorders of menstruation (4), twisted ovarian cyst (1), ovarian cystectomy (1)	18	5.0
(XI) <i>Deliveries and Complications of Pregnancy, Childbirth, and the Puerperium</i> Normal delivery (19), caesarean section (1), abortion (6), therapeutic termination (6) (Total: 32—i.e., 24.8% of all female admissions)	32	8.9
(XII) <i>Diseases of Skin and Cellular Tissue</i> Erythema nodosum (1), drug eruption (2), infections of skin and subcutaneous tissue (5)	8	2.2
(XIII) <i>Diseases of Bones and Organs of Movement</i> Loose body in knee, meniscectomy (7), ruptured inter- vertebral disc (1), other symptoms referable to back (1)	9	2.5
(XVII) <i>Accidents, Poisoning, Violence</i> Accidents causing death (6), found dead (2), injuries involving fractures or dislocations (19), multiple lacerations, contusions, concussion (19) other injuries (5)	51	14.3
Total admissions	358	100.0

* The number of admissions may be greater than the sum of the numbers in parentheses because some individuals were admitted on more than one occasion.

Deaths (12)	Accidental	6
	Found dead	2
	Malignant hypertension ..	1
	Neoplasms	3

occurring while *in statu pupillari*, and the contribution of trauma—that is, road traffic accidents—to mortality in this age group is underlined. In some instances the student was dead on arrival at hospital, and these ought strictly, perhaps, to have been excluded from the total of hospital admissions, but the picture would have been incomplete without them. Two students were “found dead” in circumstances which aroused suspicion of suicide—a surprisingly small number bearing in mind the size of the population at risk over a three-year period and experience at other universities (Rook, 1959).

Conclusion

The report of the W.H.O. Expert Committee and a report of the Royal College of Physicians (1966) both recommended that university health services should provide their own accommodation, preferably centralized, for the treatment of certain categories of sickness among students. This is not the place for a description of how such accommodation might best be organized or of the undoubted advantages it confers. It will suffice to say that in common with a number of universities this service is now being developed at Newcastle upon Tyne, and some cases which might formerly have been admitted to hospital will in future be admitted to it.

This note should not, of course, be thought to reflect the scope and volume of clinical and preventive work in a com-

prehensive university health department the facilities of which are extended, in one form or another, to all members of the university community. It is clearly incomplete even as a prevalence study of morbidity among students. But if it does nothing else, at least it should dispose of the notion, still evidently held in some quarters, that—psychological disorders apart—a description of illness among students is adequately covered by “influenza, the occasional inflamed appendix, and athletic injuries” and that students are seldom really ill at all.

This work, part of a larger study into the implications of morbidity among university students, was supported in part by a grant from the Nuffield Provincial Hospitals Trust.

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NEW APPLIANCES

New Alarm for Treatment of Nocturnal Enuresis

Mr. H. J. TERRY, Department of Medical Electronics, St. Bartholomew's Hospital, London E.C.1, writes: Alarms for the treat-

FIG. 1.—Enuresis alarm unit and a two-shilling piece.

ment of nocturnal enuresis, as described by Gillison and Skinner (1958), are in widespread use. The first aim in designing a new one was to minimize the risk of “buzzers ulcers,” which were investigated by Borrie and Fenton (1966). The opportunity was taken to make the unit not only safer but also more reliable and more easily used and maintained than types employing relays, bells, or buzzers. Since high-quality silicon transistors now cost only two or three shillings, the cost of construction is only slightly increased.

Operation of the alarm has been made as simple as possible. As in earlier systems, a pad with two isolated electrodes is placed under the bottom sheet in the patient's bed and connected by a length of flex to a jack plug. Pushing the jack plug into its socket closes the switch, and the alarm is then ready for use. When the alarm is triggered by urine reaching the pad the loudspeaker wakes the patient with a steady note. This is switched off by simply unplugging the pad, and the alarm is again ready for use as soon as a dry pad is plugged in. The unit is powered by four pen-torch cells, which are sufficient for several months' use.

were built and sent out, with forms on which the user was asked to record each day whether the bed had been wet in the night and if the alarm had functioned correctly. Records of 40 months' use of alarms have so far been received, and as a result of the favourable reports by doctors and patients the alarm is being produced commercially.*

The unit is shown in Fig. 1 and the circuit diagram in Fig. 2. For those interested in electronics, TR 1 and TR 2 act as a switch, which responds to a current through the pad of about 400 microamps. With TR 1 and 2 conducting, TR 3 and 4 act as an emitter-coupled astable multivibrator. TR 5 and 6 merely amplify the square wave so produced, and drive the loudspeaker. Two safety features are included. R 1 ensures that, even if a fault occurs elsewhere in the circuit, the current through the pad cannot exceed 1 milliamp. The diode, D, provides the further safeguard that once the alarm has been triggered the potential across the pad cannot exceed 1 volt. To avoid false alarms when switching on it may be necessary to add a capacitor, similar to C 1 and C 2, between the base and emitter of TR 2.

I wish to acknowledge the help given by members of the Department of Medical Electronics in making the alarms, and by the medical officers, general practitioners, and patients in testing them. I am also grateful to the Endowment Fund of the hospital for financial support.

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* By Astric Products Limited, 261 Queen's Park Road, Brighton 7.

FIG. 2.—Enuresis alarm circuit. Components list: R 1, 5,600 ohms. R 2, 1,000 ohms. R 3 and 4, 4,700 ohms. R 5 and 6, 820 ohms. R 7, 470,000 ohms. R 8, 220 ohms. C 1 and 2, 0.01 microfarad. TR 1, 3, and 4, 2N 3710 (Texas Instruments). TR 2 and 5, 2N 3702 (Texas Instruments). TR 6, 2N 3706 (Texas Instruments). D, 1S940 (Texas Instruments). L. S., loudspeaker 25–35 ohms. Battery, 4 cells, U 12/D 14.

In answer to a letter in the *British Medical Journal* (Terry, 1966) 16 inquiries were received from doctors interested in trying out the new alarm. Nineteen alarms