Furthermore, had the extent of the epidemic been more fully appreciated it might have been possible to co-ordinate the work of the various practitioners in the district and to have advised upon the use of such protective measures as gamma-globulin.

Summary

Details of an epidemic of infectious hepatitis occurring in a village community are reported.

The source of infection appeared to be the village primary school, where at least one food-handler was affected and toilet facilities were not regarded as ideal.

The epidemic was subsequently characterized by a high incidence of spread to family contacts of the children originally affected.

Although the clinical course was mild in children, a young married woman developed acute hepatic necrosis and died.

It is believed that the extent of the epidemic was far greater than the 61 cases reported would indicate, and it is suggested that some form of notification of infectious hepatitis is desirable in order to improve our knowledge of the aetiology and epidemiology of this disease.

We wish to record our thanks to Drs. P. C. Green, R. H. Kipping, W. J. Low, and H. N. Smith, who supplied details of cases occurring in their practices, and Dr. A. J. Muir, Medical Officer of Health for the area, for his report. We also thank Professor Sheila Sherlock for her helpful comment.

REFERENCES

Glover, J. A. A., and Wilson, J. (1931). *Lancet*, **1**, 722.
Mosley, J. W., and Smither, W. W. (1957). *New Engl. J. Med.*, **257**, 590.
Pickles, W. N. (1939). *Epidemiology in Country Practice*, p. 59. Wright, Bristol.
Rightsel, W. A., Keltsch, R. A., Taylor, A. R., Boggs, J. D., and McLean, I. W. (1961). *J. Amer. med. Ass.*, **177**, 671.
Tilley, J. D. McD. (1960). *Brit. med. J.*, **2**, 1354.
Ward, R., Krugman. S., Giles, J. P., Jacobs, A. M., and Bodansky, O. (1958). *New Engl. J. Med.*, **258**, 407.
World Health Organization (1953). *Tech. Rep. Ser.*, No. 62.

According to the *Report on War Pensioners for 1961* the Ministry of Pensions and National Insurance was paying 700,000 war pensions—about 268,000 for the 1914 war and 431,500 for the 1939 war—at the end of 1961. The total includes about 506,000 disablement pensions, about 138,000 widows' pensions, and 56,000 pensions for parents, orphans, and other dependants. The amount being paid in war pensions and allowances at the end of 1961 was at the rate of more than £100m. a year. The report is made jointly by the Ministry of Pensions and National Insurance, the Minister of Health, and the Secretary of State for Scotland, and includes an account of medical and surgical treatment for the war disabled and details of welfare work, and other war pensions activities in the various regions. Limbs and appliances supplied and repaired by the Ministry of Health included 3,237 artificial legs and arms supplied and 31,779 repaired; 6,953 appliances of various kinds, 776 artificial eyes, and 11,107 surgical boots were also supplied. The number of invalid chairs and tricycles in use at the end of 1961 was 4,632; the number supplied during the year was 955. The number of motor-cars in use at the end of 1961 was 3,122 and 1,490 were issued during the year. A new artificial limb and appliance centre was opened at Liverpool in July, 1961. The new Birmingham centre was formally opened in January this year and good progress is being made with the new Portsmouth centre. (H.M.S.O., price 6s. 6d.)

Preliminary Communications

Mosaicism in a Mother with a Mongol Child

The simple trisomic condition commonly associated with mongolism can be referred to the failure of homologous chromosomes, or of sister chromatids, to go to opposite poles during gametogenesis. Non-disjunction leading to trisomy 21 (Denver system) usually occurs in individuals with normal chromosome complements (primary non-disjunction) and is influenced by aetiological factors associated with maternal age.

The bimodality of the maternal age effect observed in mongolism (Penrose, 1951, 1954, 1961) suggests that in a proportion of cases factors independent of maternal age are of importance. Penrose further points out that investigation of familial examples of mongolism again shows the presence of a group in which maternal age is not an appreciable aetiological factor.

Chromosome abnormalities, translocations, and/or isochromosomes, not referable to primary non-disjunction, have been described in mongols born to young mothers (Polani *et al.*, 1960; Penrose, 1961). This type of abnormality may account for a substantial part of that proportion of cases where aetiological factors other than maternal age are of importance. Translocations and/or isochromosomes have also been shown to be a cause of familial mongolism (Penrose *et al.*, 1960; Carter *et al.*, 1960; Hamerton *et al.*, 1961).

Another variant of the simple trisomic condition is 21-trisomy/normal mosaicism (Clarke *et al.*, 1961; Fitzgerald and Lycette, 1961; Nichols *et al.*, 1961; Hayashi *et al.*, 1962; Richards and Stewart, 1962). In 21-trisomy/normal mosaicism some tissues (or parts of tissues) of a single individual are composed of cells with an extra chromosome No. 21 and other tissues of cells with a normal chromosome complement. It is reasonable to suppose that some mosaic individuals will have only slight signs of mongolism or be clinically indistinguishable from members of the general population. The patients described by Clarke *et al.*, Fitzgerald and Lycette, and Hayashi *et al.* exhibit the physical features of mongolism in a very incomplete form. If the gonads are involved in this mosaicism (gonadal mosaicism) some offspring would be expected to inherit an extra chromosome No. 21 (secondary non-disjunction) and to exhibit mongolism. Mosaicism leading to secondary non-disjunction is then a potential cause of familial mongolism (Penrose, 1959; Clarke *et al.*, 1961; Hamerton *et al.*, 1961) and of mongolism which is independent of maternal age. This communication deals with a young married woman who shows some of the features of mongolism and has a mosaic karyotype. Her daughter is a classical case of mongolism and has the standard trisomic condition.

MAIN CLINICAL FEATURES

The propositus (Fig. 1), a 31-year-old married woman, came to the attention of one of us (E. G.) because of anxiety symptoms with hysterical features. Mental subnormality (I.Q. approximately 60), Brushfield spots,

a fissured tongue, and her palmar and digital ridge patterns made us suspect a diagnosis of mongolism. She was her mother's second child and was born when her mother was 40 years and her father 42 years old.

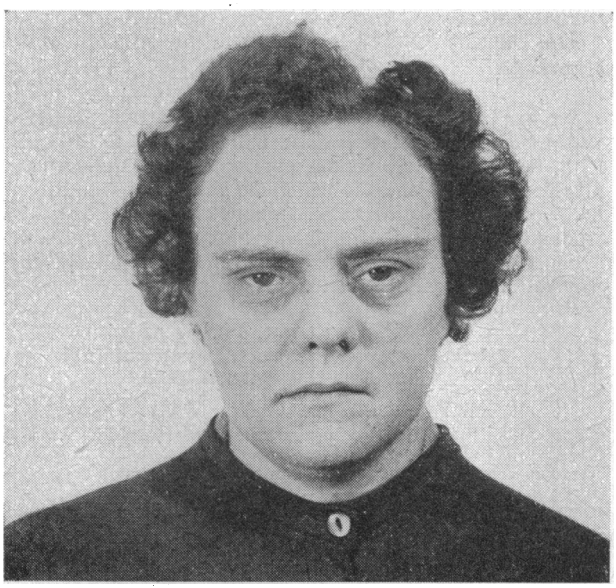

FIG. 1.—The propositus, a 31-year-old married woman with a mosaic karyotype.

Her child (Fig. 2) is a classical mongol, born when the propositus was 28 years old.

CHROMOSOME ANALYSIS

One hundred and sixteen cells were counted in peripheral blood preparations derived from the propositus (Table, Figs. 3 and 4). An extra chromosome in the 21–22 group was observed in each of the 15 cells containing 47 chromosomes. Sixteen of the 95 cells containing 46 chromosomes were analysed in detail and each showed a normal female complement. The missing chromosome in the cells with a count of 45 was variable.

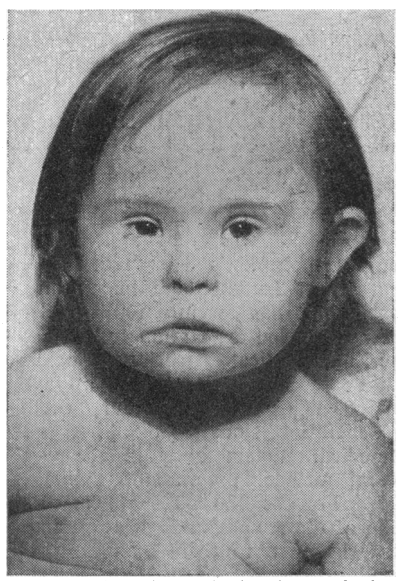

FIG. 2.—The mongol daughter of the propositus.

Each of the 30 cells counted (see Table) in a peripheral blood culture obtained from the mongol child contained 47 chromosomes. An extra chromosome No. 21–22 (Fig. 5) was observed in each of the four cells analysed in detail.

INTERPRETATION

Cytological examination showed the presence of normal and " mongol " cells in cultures derived from the propositus. She is therefore a 21-trisomy/normal mosaic. The standard trisomic condition was present in the child.

The mosaicism present in the propositus may have originated in two ways. Mitotic non-disjunction during

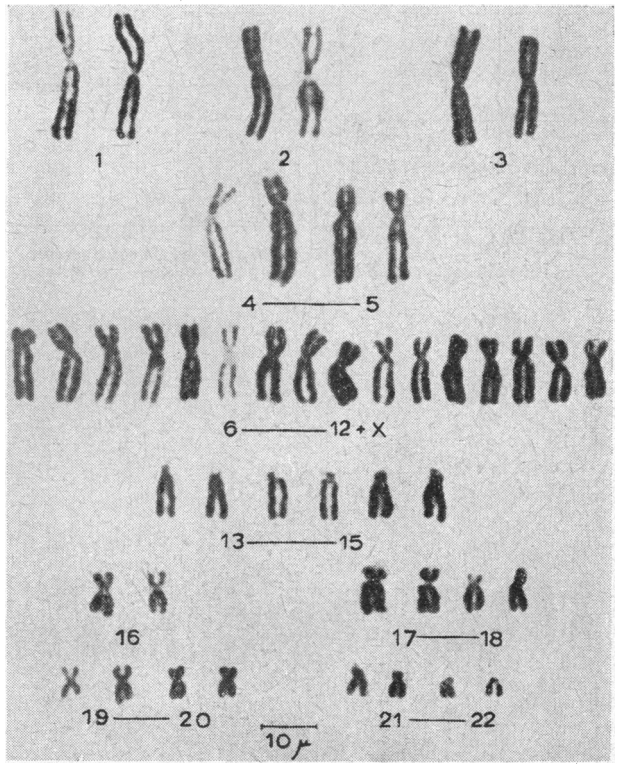

FIG. 3.—Karyotype of the propositus. Idiogram of a cell with normal chromosome complement.

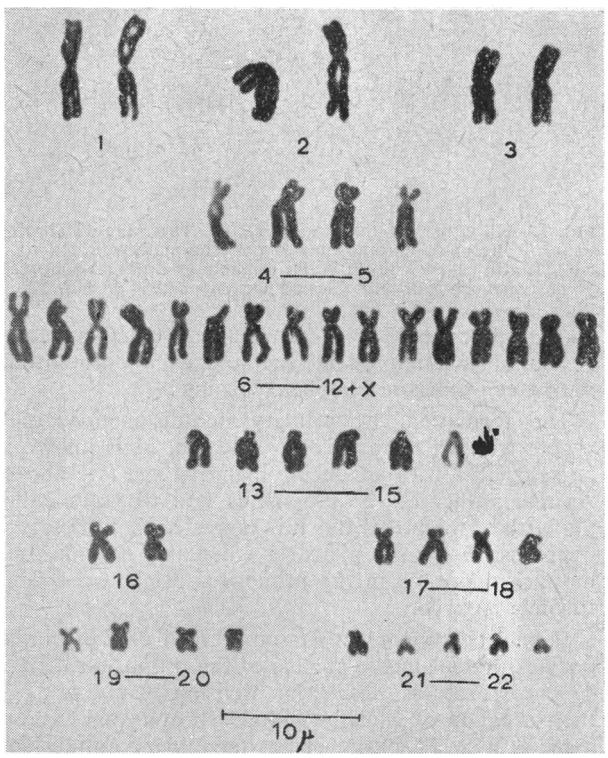

FIG. 4.—Karyotype of the propositus. Idiogram of a cell with an extra chromosome No. 21 or 22 (Denver system).

early cleavage in a normal embryo could result in the formation of two new aneuploid cell lines—one with an extra chromosome No. 21, the other with a chromosome No. 21 missing—in addition to the euploid cell line. On the other hand a normal cell line with 46

Chromosomal Counts of Mother and Daughter

Patient	Tissue	Chromosome Counts						% of Cells with 47 Chromosomes
		45		46		47		
		C	A	C	A	C	A	
The propositus	Peripheral blood No. 1	2	2*	67	8†	11	11‡	14
	Peripheral blood No. 2	4	4*	28	8†	4	4‡	11
The child	Peripheral blood	0	—	0	—	30	4‡	100

C=Counted. A=Analysed.
* Missing chromosome variable. † Normal female complement.
‡ Each cell contained an extra chromosome in the 21–22 group.

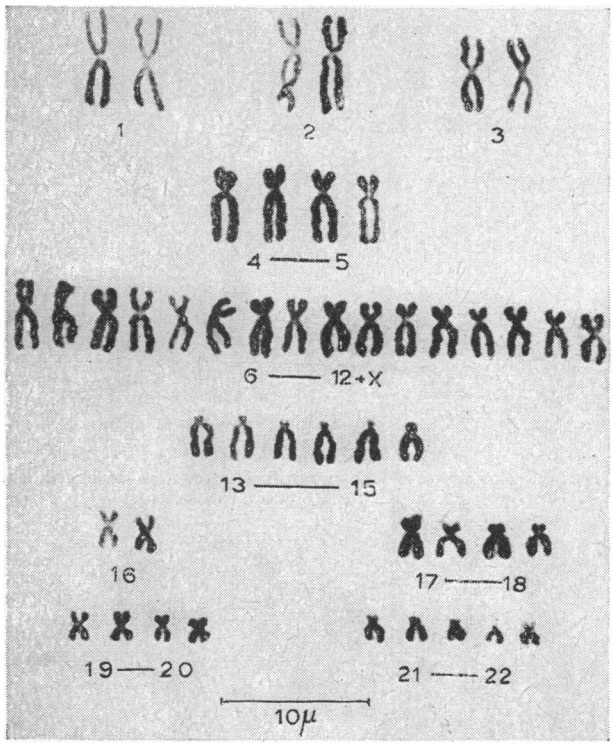

FIG. 5.—Karyotype of the mongol child. There are 47 chromosomes. The extra chromosome is conventionally referred to as No. 21, although usually it is not possible to distinguish between chromosome pair No. 21 and chromosome pair No. 22.

chromosomes could arise from a trisomic embryo either by non-disjunction or by the loss of a chromosome during cell division (anaphase lagging).

The formation, by primary non-disjunction, of a zygote with an extra chromosome No. 21 is known to be associated with advancing maternal age (see above). As the mother of the propositus was 40 years old at the birth of the propositus it is suggested that the second hypothesis is more plausible—that the chromosomal mosaicism present in the propositus originated from a trisomic embryo.

It may be supposed that some or all of the primary oocytes present in the gonads of the propositus contain 47 chromosomes. Reduction division would result in the formation of gametes with 23 chromosomes and of gametes with 24 chromosomes (secondary non-disjunction). Trisomy for chromosome No. 21 in her child probably resulted from the fertilization by a normal sperm of an ovum with an extra chromosome No. 21 derived by secondary non-disjunction.

Although the propositus has a high risk of having a second mongol child an accurate estimate of this risk cannot at present be given.

This family will be described in greater detail elsewhere.

We are indebted to Dr. F. Thorpe and Dr. F. Esher for permission to investigate these patients, and to Professor L. S. Penrose, F.R.S., for his observations on the dermatoglyphic patterns. Others to whom the authors wish to express their appreciation are Dr. V. Dubowitz, Miss D. Lee, Mrs. Audrey Bishop, and Miss Diana Saxty. This study was supported by a grant from the Medical Research Trustees of the National Spastics Society.

C. E. BLANK, Ph.D., M.B.,
Lecturer in Medical Genetics, Department of Genetics, The University, Sheffield.

ELIZABETH GEMMELL, M.B., D.T.M.&H.,
Medical Officer, Middlewood Hospital, Sheffield.

M. D. CASEY, M.B.,
Research Assistant,
Department of Genetics, The University, Sheffield.

MARY LORD, Ph.D.,
Research Assistant,
Department of Genetics, The University, Sheffield.

REFERENCES

Carter, C. O., Hamerton, J. L., Polani, P. E., Gunalp, A., and Weller, S. D. V. (1960). *Lancet*, **2**, 678.
Clarke, C. M., Edwards, J. H., and Smallpeice, V. (1961). Ibid., **1**, 1028.
Fitzgerald, P. H., and Lycette, R. R. (1961). Ibid., **2**, 212.
Hamerton, J. L., Briggs, S. M., Giannelli, F., and Carter, C. O. (1961). Ibid., **2**, 788.
Hayashi, T., Hsu, T. C., and Chao, D. (1962). Ibid., **1**, 218.
Nichols, W. W., Fabrizio, D. P. A., Coriell, L. L., Bishop, H. C., and Boggs, T. R. (1961). *Amer. J. Dis. Child.*, **102**, 452.
Penrose, L. S. (1951). *J. ment. Sci.*, **97**, 738.
—— (1954). *The Biology of Mental Defect*, 2nd ed., p. 186. Sidgwick and Jackson, London.
—— (1959). In *Ciba Foundation Symposium on Biochemistry of Human Genetics*, p. 9, edited by G. E. W. Wolstenholme and C. M O'Connor. Churchill, London.
—— (1961). *Brit. med. Bull.*, **17**, 184.
—— Ellis, J. R., and Delhanty, J. D. A. (1960). *Lancet*, **2**, 409.
Polani, P. E., Briggs, J. H., Ford, C. E., Clarke, C. M., and Berg, J. M. (1960). Ibid., **1**, 721.
Richards, B. W., and Stewart, A. (1962). Ibid., **1**, 275.

Mr. J. Bootes (St. Bartholomew's Hospital), who is currently the President of the International Federation of Medical Student Associations, has recently returned from North America, where he attended the National Convention of the Student American Medical Association held in Washington, at which he received a large vote in favour of their joining I.F.M.S.A. This is an important milestone in the history of the Federation, since the S.A.M.A. is the largest independent medical student body in the world, and already has several medical programmes similar to those of the I.F.M.S.A. For the 220,000 members of the I.F.M.S.A. the inclusion of the American association among the member countries will open to them many clerkship posts in American hospitals as well as in 41 of the American Medical Faculties, whose deans have already agreed to enter into the Medical Student Exchange Scheme. He was also able to start negotiations for the establishment of another Scholarship for the British Medical Students' Trust. This scholarship, tenable at the Montefiore Hospital, New York, will be for three months in any of the hospital's departments, plus a short time spent with an American general practitioner. It is anticipated that the scholarship will be awarded next year for the first time.