

eye such as cataract, glaucoma, and microphthalmia. Most infants with the expanded syndrome, however, also had hepatosplenomegaly and a bulging anterior fontanelle and were of low birth weight.

Another feature of the syndrome was the presence of characteristic lesions in the metaphysis of the long bones.⁸ These lesions appeared on x-ray films as abnormal areas of translucency. Similar bone changes were observed in half the infants born in the Philadelphia General Hospital during the epidemic period and are described by Dr. J. M. Lindquist and his colleagues at page 1401 of this week's *B.M.J.* Dr. Lindquist and his colleagues found osteoclasts in the tibial lesions of one child and postulate that the lesions are due to viral osteitis. A. J. Rudolph and his co-workers, on the other hand, think that the changes are due to a defect in the formation of bone which is secondary to metabolic or nutritional disturbances.⁸ Similar radiological changes in the long bones are occasionally seen in newborn children suffering from other diseases, but they have not previously been reported in congenital rubella. Fortunately, the bone lesions—like the thrombocytopenia—generally resolve in the early months of life. The infants studied in Philadelphia showed a lower incidence of thrombocytopenia than those reported in other studies. Furthermore, none of them showed myocardial necrosis, jaundice, hepatitis, interstitial pneumonia, or anaemia—though these disorders have been noted in a few infants with the expanded rubella syndrome by other workers.⁴⁻⁹

Despite the severity of the congenital rubella which followed this outbreak the total incidence of congenital defect after maternal rubella in the first trimester was 10%,¹⁰ which is no higher than that observed in previous surveys.¹¹⁻¹² This suggests that although the particular strain of virus associated with the outbreak caused unusually severe disease it did not infect the foetus more often.

Epidemiological surveys have established that foetal infection may follow inapparent subclinical maternal rubella.¹³⁻¹⁴ It may therefore be difficult to diagnose the congenital rubella syndrome if there is no history of maternal rubella or if—as sometimes happens—there is also no known exposure to infection during pregnancy. If a newborn infant is suspected to be suffering from congenital rubella, confirmation should be sought by taking throat swabs or other specimens for attempted isolation of the virus. Infants with the expanded

rubella syndrome—like those with classical congenital rubella—suffer from a chronic infection with rubella virus, and the virus can readily be isolated from throat, urine, or rectum during the first months of life.²⁻⁴ The affected infants are infectious, and cases of rubella have been observed among their attendants and family contacts.³⁻¹⁵⁻¹⁶ Studies have also been reported that show that immunity to reinfection with rubella virus is associated with the presence of neutralizing antibody.¹⁶⁻¹⁷ Volunteers who had been inoculated with the virus and persons exposed to infection from cases of the disease almost invariably failed to develop infection if they possessed detectable antibody. In contrast, those who lacked antibody suffered a high attack rate of clinical or subclinical rubella. Since the presence of neutralizing antibody is associated with almost certain immunity to rubella there is clearly hope of successful artificial immunization. The effects of a live virus vaccine have already been investigated in a small group of children.¹⁸ The vaccine caused a mild illness with the production of antibody when it was inoculated subcutaneously, but there was no response if it was administered intranasally. Virus was present in the throat of the children inoculated subcutaneously and persisted up to three weeks after inoculation. Unfortunately, these children proved to be infectious and there were some cases of rubella among their contacts. This type of vaccine is probably, therefore, unsuitable for general use, but virological developments in the study of rubella are progressing rapidly and a better vaccine may yet be possible.

Potassium Chloride and Bowel Ulceration

Last year ulceration of the small intestine from treatment with thiazide diuretics combined with potassium chloride was discussed in these columns.¹ Since then the number of reported cases has grown to well over fifty, and this week at page 1409 Mr. W. B. Ashby, Mr. John Humphreys, and Mr. Sinclair J. Smith describe six more.

The clinical and pathological features are rather characteristic. A few patients taking the combined preparation complain of vague abdominal discomfort, sometimes accompanied by nausea, diarrhoea, or anorexia. This may be attributed to indigestion or to the drug itself, and if the tablets are stopped at this stage symptoms frequently disappear. If they are not, obstruction of the small bowel may develop after a period of weeks or months. In some cases gastro-intestinal haemorrhage² or perforation have been the first indications that something was wrong. At operation one or more annular ulcers are found to be narrowing the lumen of the jejunum or ileum, and resection is usually required. Microscopical examination shows superficial ulceration, with considerable submucosal inflammation and fibrosis, but the mural blood-vessels, at least in man, appear to be unaffected.

Although many of the patients described were suffering from chronic degenerative diseases for which therapy with

¹ Rudolph, A. J., Yow, M. D., Phillips, C. A., Desmond, M. M., Blattner, R. J., and Melnick, J. L., *J. Amer. med. Ass.*, 1965, **191**, 843.

² Phillips, C. A., Melnick, J. L., Yow, M. D., Bayatpour, M., and Burkhardt, M., *ibid.*, 1965, **193**, 1027.

³ Horstmann, D. M., Banavala, J. E., Riordan, J. T., Payne, M. C., Whittemore, R., Opton, E. M., and Du Ve Florey, C., *Amer. J. Dis. Child.*, 1965, **110**, 408.

⁴ Cooper, L. Z., Green, R. H., and Mirick, G. S., *ibid.*, 1965, **110**, 416.

⁵ Ackroyd, J. F., *Quart. J. Med.*, 1949, **18**, 299.

⁶ Wallace, S. J., *Lancet*, 1963, **1**, 139.

⁷ Brown, C. M., and Nathan, B. J., *ibid.*, 1954, **1**, 975.

⁸ Rudolph, A. J., Singleton, E. B., Rosenberg, H. S., Singer, D. B., and Phillips, C. A., *Amer. J. Dis. Child.*, 1965, **110**, 428.

⁹ Korones, S. B., Ainger, L. E., Monif, G. R. G., Roane, J., Sever, J. L., and Fuste, F., *ibid.*, 1965, **110**, 434.

¹⁰ Sever, J. L., Nelson, K. B., and Gilkeson, M. R., *ibid.*, 1965, **110**, 395.

¹¹ Manson, M. M., Logan, W. P. D., and Loy, R. M., *Rep. publ. Hlth med. Sub.*, No. 101, 1960. H.M.S.O., London.

¹² Lundström, R., *Acta Paediat. (Uppsala)*, 1962, **51**, Suppl. No. 133.

¹³ Schiff, G. M., Sutherland, J. M., Light, I. J., and Bloom, J. E., *Amer. J. Dis. Child.*, 1965, **110**, 441.

¹⁴ Avery, G. B., Monif, G. R. G., Sever, J. L., and Leikin, S. L., *ibid.*, 1965, **110**, 444.

¹⁵ Schiff, G. M., and Dine, M. S., *ibid.*, 1965, **110**, 447.

¹⁶ ——— Smith, H. D., Dignan, P. St. J., and Sever, J. L., *ibid.*, 1965, **110**, 366.

¹⁷ Green, R. H., Balsamo, M. R., Giles, J. P., Krugman, S., and Mirick, G. S., *ibid.*, 1965, **110**, 348.

¹⁸ Plotkin, S. A., Cornfeld, D., and Ingalls, T. H., *ibid.*, 1965, **110**, 381.

¹ *Brit. med. J.*, 1964, **2**, 1611.

² Roberts, H. J., *J. Amer. med. Ass.*, 1961, **178**, 965.

³ Lindholmer, B., and Räf, L., *Acta chir. scand.*, 1965, **129**, 434.

⁴ Lister, R. E., *Lancet*, 1965, **2**, 794.

⁵ Kiellbo, H., Stakeberg, H., and Mellgren, J., *ibid.*, 1965, **1**, 1034.

⁶ Björnberg, A., and Gisslén, H., *ibid.*, 1965, **2**, 982.

a variety of drugs was often required, preparations of thiazides with enteric-coated potassium chloride are the one common factor. Indeed all 36 patients in a series reported from Stockholm³ were taking these drugs. Animal experiments indicate that potassium chloride is the offending substance, possibly because of the speed with which it is released from enteric-coated tablets,⁴ and that it acts either directly on the mucosa or via the submucosal blood-vessels. However, it is as well to bear in mind the recent suggestion^{5, 6} that thiazides may sometimes cause vasculitis of the skin and kidneys. Ulceration of the small bowel may represent a hypersensitivity reaction similar to that provoked by aspirin. Consequently it would be wise to warn patients taking thiazide-and-potassium preparations to report any gastrointestinal symptoms. There are several objections to the use of such combinations, and where potassium is needed it is best given separately in an effervescent form. Moreover, the need for long-term medication with thiazide and potassium in the individual patient should be constantly reviewed. The greatest danger from potassium depletion is in patients with chronic heart failure and cirrhosis of the liver, and for them diuretics other than the thiazides may be preferable.

Teen-age Pregnancy

The birth rate is rising almost everywhere. In England and Wales in the years 1961, 1962, and 1963 the total births were 817,271, 844,265, and 858,884, and for these years the number of mothers under the age of 20 when the babies were born was 60,465, 67,986, and 72,250, respectively. Thus about 8% of all births are to women in the teen-age group. Very nearly 22% of births in these young women are illegitimate, compared with an illegitimacy rate of about 5.5% in women aged 20 and over. But it should be recognized that the age at marriage of spinsters is falling, and that of teen-agers bearing children about four-fifths will be married.¹⁻³ Hence it would seem that the social response to earlier sexual maturity, as demonstrated by the falling age of the menarche,⁴ is earlier marriage.

Of those who marry under the age of 20 about 68% will have borne a child before the marriage is one year old.^{1, 2} The problems that may arise are both social and obstetric. H. M. Wallace⁵ has analysed these two aspects of teen-age pregnancy in the United States of America, and mentions the effects of early marriage on the further education of women, the higher divorce rates of those who marry young, the high fertility of teen-agers, and the obstetric troubles that occur in them. Teen-agers constitute a high-risk group of mothers and are especially apt to develop complications—such as excessive gain of weight, prolonged labour in those under the age of 14, a high caesarean section rate in those aged 12 and

13, a high rate of pre-eclamptic toxæmia and of cervical laceration, and a higher rate than average of perinatal and neonatal deaths and of prematurity. The young teen-age girl who is pregnant presents an increased risk to both herself and her child.

These American findings were not fully borne out by the study of the adolescent primigravida made in Britain by R. H. Stearn.⁶ Though his series of thirty patients was small, they were all under the age of 16 and so might have been expected to pin-point some of the major obstetric difficulties apt to be encountered. Stearn found that there was a high incidence of hypertension and toxæmia (8 out of the 30). The foetal head was not engaged before labour in over half of the girls; induction of labour was not needed at all and neither was caesarean section; the length of labour tended to be shorter than in a control group of other primiparae; and the prematurity rate was less than in the control group. Nearly all his patients had an episiotomy. A finding of interest was how little upset emotionally were these young mothers as a result of pregnancy, labour, or the puerperium. Though forceps delivery was used in most of the cases early in the series to minimize the emotional trauma of delivery, this was later found to be unnecessary.

Further investigation of teen-age pregnancy in different communities would be valuable in defining the true risks of childbearing in the young. Results from different areas may well not be comparable. Until the evidence is more clear-cut the teen-age girl who is pregnant must be watched with a wary eye. There may be a too easy tendency to assume that youth by itself may be sufficient to overcome all the obstetric difficulties. The factors known to influence the obstetric outcome—such as height of the mother, social class, work during pregnancy, and illegitimacy⁷—all have their effects independently of age and must be given their due weight however young the mother may be. In particular, since there is a correlation between the adequacy of care before and during labour and obstetric results,⁸ these mothers and their babies must receive the best possible care, though this may be difficult when social factors operate to prevent early attendance at antenatal clinics. Delivery at home should be considered only rarely for this group of patients because of the combination of social and obstetric problems which beset them.

The shadows cast by early childbearing, whether legitimate or illegitimate, fall on many fields. Any full understanding must include considerations of contraception for adolescents⁹; illegitimacy and its effects on mother, putative father, and families; housing for the young; the care of babies by the inexperienced; adoption; and obstetric care. Later will probably come a higher divorce rate, large families, and an increase in the incidence of cervical cancer and possibly of utero-vaginal prolapse.

Child Deaths and Infection

The infant mortality in Great Britain, though considerably lower than in the United States and most European countries, is much higher than in Scandinavia. The reasons are not altogether clear. A major cause of deaths in the newborn period is prematurity—and the premature-delivery rate is higher in Britain than, say, in Norway. Here an important

¹ *The Registrar-General's Statistical Review of England and Wales for the Year 1961*, Part II, 1963. H.M.S.O., London.

² *The Registrar-General's Statistical Review of England and Wales for the Year 1962*, Part II, 1964. H.M.S.O., London.

³ *The Registrar-General's Statistical Review of England and Wales for the Year 1963*, Part II, 1965. H.M.S.O., London.

⁴ Tanner, J. M., *Growth at Adolescence*, 2nd edition, 1962. Blackwell, Oxford.

⁵ Wallace, H. M., *Amer. J. Obstet. Gynec.*, 1965, 92, 1125.

⁶ Stearn, R. H., *Lancet*, 1963, 2, 1083.

⁷ Kincaid, J. C., *Brit. med. J.*, 1965, 1, 1057.

⁸ Butler, N. R., and Bonham, D. G., *Perinatal Mortality*, 1963. Livingstone, London.

⁹ Schofield, M., *The Sexual Behaviour of Young People*, 1965. Longmans, London.