secondary antibody against either autologous damaged kidney antigen or non-specific antigen initially deposited as soluble complex.⁵⁶

Finally, what of the rather common condition where no glomerular abnormalities are visible? The nephrotic syndrome, or symptomless proteinuria in association with the so called "minimal-change" lesion (lipoid nephritis⁹²), is most often seen in childhood but may occur at any age.⁹² There is no spontaneous or animal nephritis which bears any resemblance to this condition. In man several clues suggest that immune events may be important. The frequently recurring attacks of nephrotic syndrome may follow immediately on a variety of viral and bacterial infections. A tiny minority of patients have attacks in association with exposure to specific antigens, particularly grass pollen.^{109 110} At the same time there is no evidence that immunoglobulins, cells, fibrinogen, or complement are present in the glomerulus, and how the permeability of the filter is disturbed remains a mystery.

We have been pursuing the idea that IgE-mediated responses, with release of vasoactive substances, might be the mechanism. Mast cells, however, are infrequent in the kidney and absent from glomeruli. We have also studied four patients with specific pollen sensitivity who relapse on exposure to allergen (grass pollen and spring flowers). At the height of pollen-induced relapse in one patient, when plasma IgE levels were at their height, we failed to show IgE in the glomeruli despite careful study.¹¹¹ This is in agreement with other observations in "minimal change" nephrotics.¹¹² The findings of IgE in the glomeruli in "lipoid nephrosis" by Gerber and Paronetto¹¹³ are interesting but require confirma-

FIG. 4—Long-term effect of cyclophosphamide on relapses in nephrotic children with "minimal change" lesions.⁹²

tion. Two further pieces of evidence need to be fitted into the jigsaw. Ngu *et al.*¹¹⁴ found evidence of reacted complement in patients in relapse, and the prolonged remission with eventual relapses after several years induced by cyclophosphamide (Fig. 4) could suggest the participation of some long-lived group of cells. Mallick *et al.*¹¹⁵ suggested that these patients retain cell-mediated sensitivity to kidney antigens but others did not.^{16 18} This approach obviously needs further study, and how and whether such cells might participate in the injury is an interesting subject for speculation.

The conclusion of this lecture will appear in next week's issue, together with a list of references.

New Appliances

Graphic Records in Labour

British Medical Journal, 1972, 4, 163-165

R. H. PHILPOTT, Sims-Black professor in obstetrics and gynaecology, University of Rhodesia, Salisbury, Rhodesia, writes: From our experience in the Harare Maternity Hospital, Salisbury, graphic recordings greatly improve the management of labour in the individual and the administration of the labour ward as a whole. They are more efficient than lengthy written notes and provide a pictorial display of all the essential features of a labour and immediately alert the attendant to abnormal developments. Graphic recordings are also of particular value in teaching medical students and pupil midwives the recognition of normal and abnormal labour.

The composite graph used in Harare Hospital has proved to be suitable for use in small peripheral clinics and hospitals in Rhodesia, where staff shortages necessitate a simple, efficient method of recording. It has also been used in several British hospitals, where acceptance has followed introductory explanation (J. W. W. Studd, personal communication, 1971).

The graph (Fig. 1), which measures 25 by 40 cm forms the double-page spread of the centre of the patient's bound maternity record and is attached to a clipboard at the foot of the patient's bed. The recordings are made by the midwife or doctor. The doctor's findings on admission are recorded on the previous page and any extra intrapartum information, such as consultant's comments, are recorded on the succeeding page. The details of the components of the graph have

evolved over the past five years and the graph described below has been in use for the past 12 months in the management of over 8,000 patients. The whole graph revolves around the main feature, which is the cervicographic record of labour progress. The details are given in the order in which they appear on the graph.

Components of Labour Graph

TIME

Zero time is taken as the time of admission to hospital rather than the problematical time of onset of labour. The actual time is recorded on two lines, one for each half of the record. In addition the hours from admission are marked off to alert the observer to the passage of time. Although most labours are completed in less than 12 hours from admission to hospital, we have extended our graph to cater for inductions of labour, which sometimes take a little longer.

FETAL HEART RATE GRADING

The conventional method of recording the fetal heart rate between contractions is too inexact a measure of fetal condition to be of any clinical value. Wood *et al.*¹ showed that the effect on the fetal heart rate of uterine contractions was the earliest sign of fetal distress. We have monitored on the cardiocograph the deteriorating fetal condition in a few

FIG. 1—Example of composite labour graph. Full size 25 by 40 cm.

women who have refused Caesarean section for fetal distress and, as a result, now use the grading of severity of fetal heart rate change shown in Fig. 2.

We recognize that this grading may need later modification and that it may not represent the stages of deterioration in all types of fetal distress. It does, however, ensure the categorization of abnormal patterns and in most cases gives a graphic picture of fetal condition. The recordings are made half-hourly

FIG. 2—Grading of fetal heart rate patterns used on composite labour graph.

Day *et al.*,² showed that it is possible to detect abnormal fetal heart rate patterns by counting the rate with a stethoscope at 30-second intervals before, during, and after a contraction. In difficult cases this becomes possible with the help of the Sonicaid. With experience, our midwives have become increasingly more proficient in using this clinical method of fetal heart rate grading as checked by the cardiocytograph.

LIQUOR

If the membranes are intact we record in the appropriate column an "I," if the liquor is clear a "C"; if the liquor is meconium stained an "M." If the membranes are ruptured on admission the duration is recorded at the beginning of the line marked "Liquor."

MOULDING

This can be recorded as + or ++. It is an important sign that alerts one to increasing evidence of disproportion and is often the only sign of fetal distress in this complication.

CERVICOGRAPH

This is the central feature of the labour graph for, as Friedman³ showed, the cervicograph is the most important and only exact evidence of the rate of progress of labour. Once labour is well established we do four-hourly vaginal examinations to assess the cervical dilatation. After plotting the cervical dilatation with an "X" it is wise to decide then when one wishes to do the next cervical assessment and to mark this by an arrow on the time scale. The initial vaginal examination done on admission is a thorough pelvic exploration, but to minimize infection subsequent examinations need be only simple one-finger cervical assessments. To improve uniformity and accuracy we have a reference diagram on the wall with 10 circles of increasing diameters in 1 cm steps.

The position of the fetal head can be recorded next to the "X" for the cervical dilatation. This is done by recording a figure relating the occiput to a point on the clock—for example, right occipitolateral 9, and left occipitoposterior 4.

Concept of Alert and Action Lines

Having plotted the patient's cervicographic progress it is important to know whether at any point this has become inefficient, warranting active intervention. We have constructed an alert line on the cervicograph,⁴ which is a modification of the mean cervicographic progress of the slowest 10% of normal African primigravid patients admitted in the active phase of labour—that is, with the cervix at least 3 cm dilated and 100% effaced. It is a straight line drawn on the cervicograph beginning at 1-cm dilatation at zero time and progressing at 1 cm an hour to full dilatation at nine hours from admission (Fig. 3). This line compares with Friedman's³ statistical limit for cervicographic progress in his primigravid patients in the active phase of labour of 1.2 cm an hour and therefore has universal application.

FIG. 3—Alert line and action line on cervicograph.

The alert line is applicable to all primigravid patients admitted at any time in the active phase of labour. If, however, a patient is admitted before 3-cm dilatation, progress is charted on a blank graph without the alert line until 3-cm dilatation is reached. Further progress is then charted on the standard composite graph with the alert line, regarding the time at 3 cm as zero time.

The purpose of the alert line is to aid the midwife in a peripheral unit in Central Africa, or a general practitioner, midwife, or house surgeon in any hospital to detect at the earliest possible moment the abnormal labour. When a patient's cervicograph crosses the alert line, arrangements should be made to transfer the patient to the intensive care area of the labour ward of a central unit, for this now becomes a labour at risk.

We have arbitrarily drawn an action line parallel and four hours to the right of the alert line (Fig. 3). This allows time to transfer the patient without impairing the success of the essential active management, and also allows many normal patients to deliver vaginally without active intervention. The regimen of management that we conduct at the time a labour crosses the action line is detailed elsewhere.⁴ The regimen of activity may vary in different parts of the world but there can be no doubt that action is then necessary.

Although the alert and action lines were originally designed for primigravidae, we also use them in the management of the multigravida, who normally progresses more quickly than the primigravida. The difference in application occurs at the time of crossing the action line, for the use of oxytocic augmentation can be hazardous in the multigravid patient.

DESCENT OF HEAD

Rather than using the inexact terminology of "fixed" and "engaged" we have adopted the more exact terminology first described by Crichton.⁵ He defined the level of the head in relation to the brim of the pelvis as the number of "fifths" of the head still above the brim of the pelvis (Fig. 4). The number of fifths can then be plotted on the cervicograph with an "0" (as opposed to the "X" for cervical dilatation). The lines 0-5 on the cervicograph can be used for this purpose.

FIG. 4—Descent of head measured by abdominal palpation and expressed in terms of fifths above brim (Crichton⁵; diagram modified by Lasbrey.⁶)

The recording of the level of the head in this way gives further evidence of progress of labour and is also of help in determining the final method of delivery in the second stage of labour. This method is far more meaningful than other methods of determining the station of the head in relation to the ischial spines.

CONTRACTIONS

This is the third feature in the assessment of the progress of labour. It becomes of particular importance in recognizing types of uterine inefficiency and also when oxytocin stimulation is used. The contractions are plotted immediately below the cervicograph according to the key and example described

FIG. 5—Recording of contractions. First half-hour: in the last ten minutes of the half-hour there were two contractions lasting less than 20 seconds. Third half-hour: in the last 10 minutes of the half-hour there were three contractions lasting less than 20 seconds. Sixth half-hour: in the last 10 minutes of the half-hour there were four contractions lasting less than 40 seconds. Seventh half-hour: in the last 10 minutes of the half-hour there were five contractions lasting more than 40 seconds.

in Fig. 5. This is an adaptation of a method described by Eskes.⁷ The frequency is recorded half-hourly as the number of contractions in the last 10 minutes of each half-hour period and this number of blocks shaded in according to the duration of the contractions. We find that the patients are able to help in counting the frequency of contractions by using the labour ward clock.

DRUGS AND INTRAVENOUS FLUIDS

These are recorded in the space provided and ticked off when they are given or stated.

OXYTIC STIMULATION

When oxytocic stimulation is used for induction of labour or the stimulation of inefficient labour this can be recorded in the two lines provided. In the first line marked "Oxytocic" the number of units in a litre is recorded and in the next line the number of drops a minute.

BLOOD PRESSURE, PULSE, AND TEMPERATURE

These are self-explanatory.

URINE

Albumin and acetone content and urine volume are recorded every time urine is passed. This has particular importance in patients on oxytocin drips because of the antidiuretic effect of oxytocin.

Comment

After the enthusiastic acceptance in our maternity unit of the composite graphic record of the first stage of labour we are now assessing a suitable graphic record for the second stage of labour. This will be reported on at a later date.

Appreciation is expressed to the obstetric research assistants, Miss I. A. Edmonstone and Miss Doris Shepherd, for help in the application of the graphic records in the labour ward, to Mr. Alan Bedford for preparing the diagrams, and to Miss Jennifer Biggar for typing the script.

Copies of the composite labour graph can be obtained from Professor Philpott.

References

- Wood, C., Lumley, J., and Renou, P., *Journal of Obstetrics and Gynaecology of the British Commonwealth*, 1967, 74, 823.
- Day, E., Maddern, L., and Wood, C., *British Medical Journal*, 1968, 4, 422.
- Friedman, E. A., *Obstetrics and Gynaecology*, 1955, 6, 569.
- Philpott, R. H., and Castle, W. M., *Journal of Obstetrics and Gynaecology of the British Commonwealth*. In press.
- Crichton, E. D., 1962, Paper read at Interim Congress of the South African Society of Obstetricians and Gynaecologists.
- Lasbrey, 1971, Personal communication.
- Eskes, T. K. A. B. 1962, MD thesis, University of Nijmegen.