

THE FIRST WEEK OF LIFE:

A STUDY ON ITS MORTALITY AND

ITS POSITION IN PREVENTIVE MEDICINE.

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I N T R O D U C T I O N .

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Since the opening of the twentieth century the campaign by Public Health Authorities all over the country to lower the Infantile Mortality Rate has grown in volume and intensity. The results are evidenced by the gradual and practically continuous reduction of the I. M. rate from 154 per 1,000 births in 1900 for England and Wales to 80 in 1920. Analysis of the annual rates shows that this great reduction is due chiefly to the great saving of infant life in the second half of the first year of life. Further scrutiny reveals the fact that during the first six months of life, the reduction during the first three months is disproportionately less than during the second three months; and, moreover, that the curve of mortality for the first week of life has maintained an almost uniform level with slight undulations. Stated approximately, it may be said that one-half of the I. M. rate occurs during the first three months, one third during the first month, and one fifth during the first week after birth. Looking at it in this light and bearing in mind that 15% of the total deaths in this country take place under one year, one readily grasps that the mortality during the first week of life is appalling, and that this period

offers a wide field for investigation and new endeavours in preventive medicine.

This contribution is a review of the causes at work and their distribution, a consideration of the possibilities of their prevention and an attempt to indicate the avenues along which future public health efforts may be directed most successfully.

PART I.

STATISTICS :-

The returns of the Registrar General during the decade 1911 - 1920 furnish suitable figures on which to base an investigation into the death-rate during the first week of life, and also to compare this with the death-rate of the first day of life and during the first year.

See 1 From Table I (see note 1 at end of this part) it is seen that the mortality rates for the first week show a slight tendency to decrease with the exception of a marked jump for the year 1919 to 25.66, this being the highest rate for the decade. The lowest for the series is that for 1920, when it was 21.90, this being 17% less than the 1919 rate. The sudden excorescence for 1919 upsets any uniformity about the figures and cannot be explained with certainty. On first sight this might be thought to be accounted for by the prevalence of the Influenza Epidemics, but the Registrar General in his 82nd Annual Report argues against this assumption by comparing the quarterly rates in 1918 and 1919 for the first four weeks of life of deaths due to premature birth and finding no marked increase coincident with the Influenza epidemics. He states that "while influenza has had a certain influence on the matter, it cannot account either for the difference between 1918

and 1919, nor, except in a minor degree, for the high mortality of the latter year". But is it not permissible to argue that the effects on pregnant women of the influenza pandemic during the last quarter of 1918 and the first quarter of 1919 would continue to bear some influence, although a declining one, on the death-rates of infants under four weeks throughout 1919, not only from prematurity but also other causes of infantile death? This seems to be confirmed by personal experience in a large industrial practice that abortions were more numerous during these epidemics. The R. G. states that the height of the 1919 figure is "probably dependent upon increase of vulnerability." This is indefinite. Undoubtedly this unduly increased rate was due to the effect of some unusual and temporary cause or combination of causes, and it can be plausibly suggested that the "increase of vulnerability" was due in a major degree to the effects of influenza on pregnant women.

This being assumed, it is fair to disregard the 1919 rate on account of some infrequent cause being at work. The next highest rate in the series is 24.48 for 1913, this being about 12% greater than the 1920 rate. With the 1919 figure ignored, more uniformity is observed in the rates for the decade, the variations are within 12%, and a slight tendency to decline is definitely appreciated.

Mortality for the first day of life during the decade, amounting to almost 50% of the first week mortality, again shows the highest and lowest rates on the same years, the 1919 rate, 12.11; being 17% in excess of the lowest, 10.33 in 1920. Disregarding the 1919 rate for the same reasons as above, we find again that the next highest rate is in 1913 when it was 11.82, this figure being 14% in excess of the 1920 rate. Here again the figures are fairly uniform, the variations are limited to 14%, but one cannot determine any general tendency to decline, at least not clear-cut or definite.

The I. M. rates for the first year show a gradual but not wholly continuous diminution, the 1920 rate being 38% lower than the 1911 rate. The rate for 1900 was 154, so that the 1920 rate shows a decrease of 48% on that. Such an improvement can be explained only by giving the credit to the child-welfare work which has increased in extent and intensity since the beginning of the century. L. Finlay, in his "Causes of Infantile Mortality", is "inclined to be pessimistic regarding the effect of the post-natal clinics and child-welfare societies in seriously reducing the infantile death-rate", but Chart 1 he gives showing the I. M. curves for England, Scotland and Ireland, can only be interpreted to show that infant welfare work has some effect. Otherwise, what can explain the rapid fall in the curve of England where public Health authorities have been most active in their endeavours in this direction, and the maintenance at

See 2

practically the same level of the curve for Ireland where infant welfare work is not extensive, while the fall in the curve for Scotland is intermediate. Undoubtedly there are other factors at work, but infant welfare activities cannot be ignored and the greatly accelerated rate of fall in the English curve can be adequately explained only by the work in this branch of preventive medicine.

The figures given in Table I certainly do not extend far enough back for one to be justified in formulating any general conclusion, but it is seen that during the decade there has been some little decrease in the rate for the first week, while the curve for the first day mortality seems to be maintaining about the same level. The amount of ante-natal work done during the decade was insignificant in proportion and could have no evident effect on these two rates. First-day mortality could not be expected to be at all influenced by existing post-natal efforts, but the rates of mortality for the first week of life would be affected beneficially to some extent by infant welfare work, as it is reasonable to assert that post-natal work for one child fulfils some of the requirements of ante-natal work for succeeding offspring of the same mother.

See 3

From Table II the mortality rates for the first week of life in the County Borough of Oldham are seen from 1910 to 1920. Wide variations have occurred, the lowest rate being 22.90 per

See 4

1,000 births in 1914 and the highest 33.54 in 1918. In Table III

are shown the rates for the first week of several large cities of England for the year 1921, these being selected as containing the largest figures among the annual reports where details of the first week are available. These tables amply testify that the first week of life contributes 20% or more to the total infantile mortality during the first year, an astonishingly high proportion which indicates the need and opportunities of extensive endeavours in preventive medicine in this direction. There is a great difference in the rate of 28 for Smethwick and 17 for Poplar and Portsmouth. From these figures it can be concluded with safety that much of the mortality of the first week of life results from preventable influences, for these differences cannot be reasonably explained by assuming great variations in the vitality and physical efficiency of mothers in different localities.

THE SEXES:-

In comparing the mortality of the two sexes during the first week of life from Table I, the death-rate among males exceeds that among females, and it is remarkable to observe the constancy of the amount of this excess right through the decade. What can be the explanation of this? It might be thought that it is due to the greater size of the male infant generally, involving greater risk to the foetus during parturition. But it is found that this excess almost to a similar degree exists in the rates of

mortality under one year for males and females. Nor can it be that the male is more liable to developmental defects, as a research through the R. G.'s figures shows that this excess is also found among causes of death not developmental.

ILLEGITIMACY.

From Table I it is ascertained that the death-rates of illegitimate children during the first week of life vary between 80% and 95% over the death-rates of legitimate and illegitimate combined, and its curve seems to be maintaining a fairly uniform level with minor excursions up and down and without any apparent tendency to become lower. The height of this rate is truly appalling and does not flatter administrative efforts in combating the evils of illegitimacy. Its causes are self-evident. The child is unwelcome and unwanted. Towards the end of pregnancy the mother is subject to severe mental and emotional stress and can earn her livelihood only with difficulty, and not at all during the first week of motherhood. She has to play the part of both father and mother to the child. There is great scope for improvement in this section of mortality, and instead of treating illegitimacy as a moral problem, more sympathetic consideration than has been accorded in the past should lead to successful efforts.

Geographical Distribution.

In studying geographical distribution of first-week mortality, one can take the figures supplied by the Registrar General for different areas during 1920 and safely generalize from these, as the main differences are found to be constant features of the annual returns. The most striking feature of See 5 Table IV is that, of the various areas, the rates of the North are much greater than those for the South, the Midlands' rates being intermediate. It is also seen that the highest rates in the North, Midlands and South alike are found in the rural districts and the lowest in urban districts other than County Boroughs except in the North where the rate for county boroughs is lowest. The rural excess can be explained as being due chiefly to inadequate supply of skilled help for the parturient. The lowest rate of all, 18.05, is found in London, which has the advantage of a large number of lying-in hospitals and midwifery charities, and comparing this rate with the rural rate of 25.38 in the North, one is struck with the great difference, and can safely adduce that great reduction is possible in the prevailing rates of mortality during the first week of life, either by ante-natal methods, better midwifery service, or providing better care for infants during the first week.

Distribution of Causes.

A cynic has said that death certificates are used to conceal the cause of death, not to reveal it. Whether ordinary death certificates are reliable or not, there can be no doubt that certification of the causes of death of infants dying during the first week is most unsatisfactory. Medical students receive no special training in the diseases of early infancy. Our knowledge of the pathology of the causes of death during the neo-natal period cannot be considered complete and exact, and besides, there is no common terminology in the medical nomenclature. So it is not surprising that death certificates are issued giving the causes of death in indefinite terms, e.g. the primary cause being stated as atrophy, convulsions, suffocation etc.. A change of procedure by having the doctor send the death certificate direct to the local registrar in confidence might lead to some improvement in accuracy, for the general practitioner, in fear of loss of prestige, does not care to certify as syphilis or injury at birth. How unreliable tables showing the various causes of death during the first week may prove, can be imagined, but it is interesting to scrutinize the causes and indicate which ones are preventable and which are non-preventable. An exact reckoning of the percentage of the preventable would be highly educative and of great value but it is not possible.

Congenital malformations are due to pre-natal influences and are essentially non-preventable. They average about 10% of the first-day deaths and about 13% of the first-week deaths for England

See 6 and Wales, as Table V shows. Prematurity is responsible for well over 50% of the deaths during the first day and also during the first week. This applies to both industrial and agricultural districts and generally to large cities as seen in Tables II and III. The Registrar General in his annual report 74 states that there is "considerable variation in the number of deaths from prematurity according to the class of the community." This means that there exists much scope for improvement in this the greatly preponderating cause of first week mortality. As regards the group atrophy, debility and marasmus, there can be no doubt that the social condition of the parent, involving malnutrition and overwork of the mother, is greatly responsible, for the struggle for existence among the poor must react on the foetus. The influence of parental disease, such as syphilis and the toxæmias of pregnancy, in their production is recognised. Among these there must be a good proportion of preventable. Injury at birth is credited with a small percentage, but it is very probable that it should receive a portion of those certified as prematurity, suffocation and convulsions. This cause should be to a large extent preventable by ante-natal examination and better obstetrics. Convulsions and suffocation are responsible for low figures. Some percentage of these should prove amenable to preventative measures, both intra-natal and post-natal.

In comparing the urban and rural counties the chief points noticeable are the greater mortality from congenital defects in urban

counties, the greater prevalence of atrophy, debility and marasmus in rural counties and the excess of deaths certified as being due to suffocation in urban counties.

REFERENCES.

1.

TABLE. I Mortality Rates during 1911- 1920.
 Compiled from Registrar General's Annual Reports.
 (Proportion of Deaths to 1,000 Births.)

Year	Both Sexes	Males	Females	Illegit- imates.	1st Day Mortality	1st Year Mortality.
1911	24.31	27.50	21.03	44.15	11.60	130
1912	24.17	27.40	20.82	44.15	11.28	95
1913	24.48	27.48	21.37	45.19	11.82	108
1914	24.09	27.22	20.86	46.14	11.42	105
1915	23.32	26.34	20.15	44.59	10.80	110
1916	23.35	26.15	20.21	44.66	10.92	91
1917	23.60	26.40	20.70	45.8	11.0	96
1918	23.12	25.89	20.24	41.97	11.10	97
1919	25.66	28.60	22.54	43.78	12.11	89
1920	21.90	24.71	18.95	41.01	10.33	80

2.

"The Causes of Infantile Mortality",
 Leonard Finlay.
 Medical Research Committee publication.

TABLE II. County Borough of Oldham:- Mortality during 1st week of life, 1910-20.

Compiled from the Annual Reports of Dr. J. B. Wilkinson, M.O.H.

Year.	Premature Births.	Congenital Malformations	Injury at Birth.	Atrophy, Debility, & Marasmus	Convulsions	Atelectasis.	Suffocation overlying.	Other causes.	Total 1st week	Rate per 1,000 1st week	M. 1st week
1910	50	11	3	11	4	-	-	9	88	23.71	127
1911	60	11	3	13	3	4	-	13	107	30.65	159
1912	55	9	2	6	6	1	3	15	97	28.37	117
1913	53	2	3	18	4	7	2	14	104	30.01	139
1914	51	1	5	6	6	2	-	8	80	22.90	136
1915	39	3	1	4	5	9	-	12	77	25.61	126
1916	42	3	3	12	6	1	-	17	84	31.50	122
1917	25	-	5	4	5	4	-	12	55	25.58	110
1918	37	2	1	7	3	3	-	16	69	33.54	118
1919	41	-	-	8	5	5	1	11	71	31.61	95
1920	53	3	-	12	3	2	-	17	90	26.69	105

TABLE III. Large Cities: 1st week Mortality, 1921.

	Ports-mouth.	Poplar.	Bethnal Green.	Bootle.	Liver-pool.	Gates-head.	Stoke on Trent.	Smeth-wick.
Premature Birth.	64	45	35	28	320	50	131	38
Cong. Malform's.	8	8	2	4	37	11	16	4
Injuries at Birth	3	-	4	-	14	2	1	1
Atrophy, Deb. & Marasmus.	9	10	6	4	29	18	38	5
Convulsions	2	3	1	1	18	11	9	1
Atelectasis	2	3	3	-	41	4	9	2
Suffocation, Overlying.	2	-	1	-	2	-	1	1
Other causes	7	6	3	7	31	6	2	4
Total, 1st week	97	75	55	44	492	102	207	56
Rate per 1,000 1st week	17	17	18	21	22	27	27	28
I.M. 1st year	63	83	95	96	107	106	98	88

References - continued.

5.

TABLE IV. 1st Week Mortality, 1920. - Abstract from Registrar General's Report.
Proportion of deaths to 1,000 Births.

	North	Midlands	South	E. & W.
All Areas.	24.77	21.13	18.78	21.9
County Boroughs	24.47	21.77	19.28	22.98
Other Urban Districts	25.01	20.09	19.06	21.83
Rural Districts.	25.38	21.78	19.99	22.56
LONDON.			18.05	

6.

TABLE V. Mortality of Infants in Quinquennium 1906-10, England & Wales.
Proportion of deaths to 1,000 births.

	England & Wales		URBAN Counties (containing chief centres of industry).		RURAL Counties (mainly agricultural).	
	under 1 day	under 1 week	under 1 day	under 1 week	under 1 day	under 1 week.
Premat. Birth	7.37	13.73	7.37	13.79	6.93	13.22
Cong. Defects	1.2	3.2	1.23	3.25	1.00	2.77
Atrophy, Debility & Marasmus.	1.57	3.68	1.50	3.54	1.79	4.40
Injury at Birth	.57	.87	.57	.87	.56	.80
Convulsions	.35	1.92	.37	1.98	.40	2.15
Suffocation	.09	.28	.12	.33	.05	.19
Other Causes	.37	.57	.35	.57	.31	.54
All Causes	11.54	24.50	11.52	24.61	11.05	24.28

P A R T I I

Discussion of Various Causes of Death.

Asphyxia:

Asphyxia is the condition arising from disturbance of the physiological interchange of gases. It may develop in the foetus before birth, congenital asphyxia, or after birth, acquired asphyxia.

Congenital Asphyxia:

Cessation of the placental circulation causes accumulation of carbon dioxide and insufficiency of oxygen in the foetal blood. This results in stimulation of the respiratory centre and the child takes its first breath. If this occurs before the child's head is delivered, the process of respiration is established prematurely and asphyxia is caused. It may be due to interference with the placental circulation as in placenta previa, or by abnormally frequent and powerful uterine contractions after dosage by ergot or pituitrin; too early rupture of the membranes succeeded by increased pressure on the placenta and cord, and over-rapid reduction in area of the placental site by uterine retractions favouring separation of the placenta; prolapse of the cord in flat pelvis or in breech presentation - always a serious matter

for the child.

Asphyxia should be suspected if there is a gradual slowing of the foetal heart sounds, meconium is escaping in the liquor amnii and there are excessive foetal movements. Two clinical types of asphyxia are recognised, blue asphyxia (asphyxia livida) and pale asphyxia (asphyxia pallida), the prognosis being favourable in the former and most grave in the latter.

In blue asphyxia, the skin is bluish-red in colour - cyanosed - and cardiac action is slow but fairly strong. Breathing is absent or very shallow or intermittent. Skin reflexes are present and muscular tone is good.

In pale asphyxia, the colour of the skin resembles death-pallor and the child lies as if lifeless, the only sign of life being the very slow and weak heart sounds. All reflexes are absent and muscular tonicity is wanting.

Acquired Asphyxia, in the newly born may be due to various causes. Injury to the respiratory centre may result from compression of the brain as the head is jammed through the inlet, or during severe forceps operations, or forceful extraction of the aftercoming head through the narrow pelvis or rigid soft parts. It may result from obstruction in the respiratory passages by malformations or by aspirated liquor amnii from premature respiratory movements. Persistence of the foetal circulation, as may occur in atelectasis, may be responsible.

The child is cyanotic, breathing is absent or gasping and

irregular, and the temperature is subnormal.

In the treatment of asphyxia, the indications are to free the passages so as to allow the entry of air, to stimulate the respiratory centre and to improve the flagging circulation.

In freeing the air passages, hold the infant by the ankles with the head hanging down, clear out the mouth with a piece of sterile gauze on the little finger and clean out the nasal cavities with a small wad of cotton-wool. Use a soft rubber catheter to remove mucus or liquor amnii from the pharynx and trachea.

Respiration may be reflexly stimulated by irritation of the skin. The buttocks may be smacked and cold water sprinkled over the body. The child may be quickly bathed in warm water and then rubbed thoroughly dry with warm towels. Alternative immersion in a cold bath and a hot bath (about 102° F) may be tried. With a hot mustard bath there is good cutaneous stimulation and the congestion of the internal organs tends to be relieved. These measures are usually successful in cases of asphyxia livida.

In the severer forms more energetic methods must be instituted. One of the various forms of artificial respiration must be applied - Marshall Hall's rolling, Sylvester's arm movements, Schultze's swinging, or Laborde's tongue traction. The method of choice should be regulated by the operator's complete familiarity with the technique of the particular procedure. Schultze's method is much favoured, but its scope is limited as it is absolutely contra-indicated in cases of

premature birth on account of the fragility of the cerebral vessels and the dura, in intra-cranial haemorrhage and fracture of large bones. At the same time heart massage and compression of the thorax may be tried.

Blowing of air into the air-passages seems to be a crude endeavour, either by mouth-to-mouth method or by intra-tracheal catheter. The insufflation should be alternated with compression of the thorax. It may help to inflate some atelectatic lung but it may prove dangerous through the rupture of delicate alveoli or the introduction of sepsis. Administration of pure oxygen seems more scientific.

Atelectasis.

Collapse of the lungs is clinically divided into two groups - congenital and acquired.

Acquired Atelectasis may result from occlusion of a bronchus or bronchiole, e.g. by a plug of mucus in bronchitis, or, more commonly in later infancy, it may be due to compression as by a pleural effusion.

Congenital Atelectasis may be general as with a stillbirth, or partial, when the unexpanded lung is usually the posterior and basal portions. This is most often met with in premature and debilitated infants, in whom reaction to external stimulation is feeble on account of the imperfect development of the central nervous system and who thus do not give vent to lusty crying, the whole lung area not being inflated during the first day or two as it should be normally.

Two types of fatal cases are described "In the first, the infant is born much asphyxiated and the attempts to make it breathe well and cry loudly are only partially successful. The child remains cyanosed, and dies after a few days. In the second type the initial asphyxia is as a rule severe, but the resuscitation efforts appear successful. The child, however, remains very delicate, does not thrive and is liable to attacks of cyanosis with a sub-normal temperature.

See 7 These come on suddenly and any one of them may prove fatal". The cyanosis is due to insufficient aëration of the blood, deficient response of the respiratory centre and the unsatisfactory persistence of the foetal type

See 8 of circulation, the ductus arteriosus and foramen ovale remaining patent. If the inflated lung area is sufficient to maintain an adequate supply of oxygen, bacterial infection is the most dangerous complication to fear, as collapsed lung seems predisposed to pneumonia.

In the diagnosis one cannot depend on percussion and auscultation to detect dulness and bronchial breathing, but must rely on the feeble respiration, almost imperceptible, and the cyanosis.

The treatment consists in trying to excite deep respiration. Encourage the child to cry in various ways. Apply cold water or give it hot baths or hot mustard baths. The child must be carefully handled, but do not allow it to lie on its back for long spells. During cyanotic attacks, use hot mustard baths, apply artificial respiration if necessary, and administer oxygen inhalations.

In the prevention of atelectatic conditions much benefit

would result from propaganda work among practising midwives. Clearing out the mouth and removing aspirated material from the pharynx by catheter should be the first steps whenever the initial crying is unsatisfactory. Then the skin should be vigorously and frequently stimulated as this is recognised as being the most effective means of exciting deep respirations. Instruction should also be given in the prophylaxis against pneumonia and the dangers of surface-chilling.

Overlying.

"Suffocation in bed is more frequent in winter than in summer, is highest in the poorest districts, and usually twice as high on Saturday night and Sunday morning than on any other night of the week." Obviously it is a social problem and neglect or alcoholism is responsible. Improvement undoubtedly would soon follow the wholehearted co-operation of coroners with public health authorities. Instead of authorizing the issue of a death certificate on receipt of an explanatory letter from the local doctor, as is customary in many districts, probably on the grounds of economy, the coroner, in every case of death of a young infant not under medical attention, should hold a local enquiry after an autopsy has been performed. Publicity would be a great deterrent and would also be educational in effect. In cases of drunkenness, vigorous prosecution of the offender under the Children Act, 1908, should be instituted by the public health

authorities, but the weakness here is the unreliability of the witnesses, usually neighbours of the defendant.

Preventative propaganda by public health authorities would teach the necessity for infants to sleep alone, and if cots, cribs or cradles were not available among the poor, that excellent makeshifts can be made out of the clothes-basket, a banana crate, or the bottom drawer.

Convulsions.

Convulsions in the newly-born vary in their severity and extent. Single groups of muscles may be involved, the twitchings being scarcely perceptible, or the whole muscular system may be thrown into clonic contractions at varying intervals or into tonic rigidity with increasing cyanosis on account of the muscles of respiration being implicated.

The convulsions may be functional or organic. Functional fits are an index of the instability of the nervous system. To this class belong the terminal convulsions of the final stage of atrophic conditions and the fits coincident with the onset of acute infections. It is recognised that, in these latter, fits take the place of the initial rigor of the adult and it is feasible to suppose that many infants, especially premature infants, certified as having died from convulsions, have succumbed to the initial attack of bacterial

infection such as pneumonia, which F. J. Browne has pointed out is a common cause of death in infants during the first week, it having See 10 accounted for 26% of the deaths in his series of 80. Other causes may be epilepsy, the now rarely seen tetanus neonatorum due to tetanus infection of the cord, and eclampsia neonatorum which is occasionally met with in infants of mothers suffering from eclampsia or nephritis and is supposedly due to the poisons in the maternal circulation passing through the placenta to the foetal circulation.

The majority of convulsions in very early life is organic in origin. They are due to some definite pathological change in the cerebral tissue. This may be due to intra-cranial injury to the brain or meninges during parturition, or it may be inflammatory as in acute meningitis or encephalitis, or the trouble may be due to developmental defects of the brain or acute congenital hydrocephalus.

The general treatment consists in immersion in a hot mustard bath up to the arm-pits and the application of cold compresses to the head. Of narcotics, potassium bromide and chloral hydrate may be administered per rectum in doses of grain 2 of each. If asphyxia supervenes, some method of artificial respiration is indicated. In individual cases, particular attention is to be directed to any special cause.

Congenital Malformations.

Many of these are inconsistent with independent extra-uterine existence, and if the process of birth is survived, death very often occurs within the first few days of life. There may be pronounced narrowing or even absolute occlusion of some natural passage of the body, such as the oesophagus, pylorus, rectum or anus. Gross abnormalities in the heart and large blood-vessels are inconsistent with the continuance of life. In the nervous system are found developmental defects to which the infant usually soon succumbs, such as anencephaly, encephalocele and spina bifida. In the two latter there is the additional danger from fatal injury at birth, but if born alive, radical removal should be undertaken. These are the chief malformations which affect mortality during the first week of life and with the exception of pyloric and anal defects and occasionally spina bifida and encephalocele, are beyond the scope of remedial measures.

Eugenists of a stern variety, asserting that the laws of successful propagation are flagrantly disregarded in the human species, advocate the state control of parenthood by the medical examination and certification of the contracting parties before marriage, and the sterilization of defectives by vasectomy or salpingectomy. Possibly such measures would eventually lead to some improvement in the offspring and betterment of the human stock with perhaps lessened incidence of malformations at birth, but it is inconceivable that such interference with personal liberty would be tolerated in this country. Laws in

mothers, but may be full term infants from unhealthy mothers or from a multiple pregnancy when they are sometimes specially classed as "immature" and give the impression that there has been some intra-uterine inhibition of development. These infants are constitutionally weak, their vitality is defective, and their metabolism seems to be so incomplete and imperfect that their life and development are in danger from birth if their care and supervision are the same as given to the normal thriving baby. Generally they are puny delicate children under average weight and height, with flabby skin lacking the elasticity and pinkness of the healthy. They suck weakly and show low power of reaction.

These children possess a latent tendency to disease and should receive special attention from birth onwards, sound dietetic and hygienic methods being strictly adhered to. Their condition is due to ante-natal influences, maternal ill-health or disease as tuberculosis or syphilis, unsatisfactory social conditions or some undetermined cause; and much could be accomplished in the way of prevention by instructing the pregnant in the hygiene of pregnancy.

Prematurity.

The premature child has been deprived of a certain period of the intra-uterine existence which Nature allows for the full-time child to reach its full development in preparation for extra-uterine life, and in consequence the premature child has to undertake the

functions of extra-uterine existence when not fully prepared for such, the degree of readiness varying with the duration of the pregnancy. The child is under weight and undersized, the lower limbs being shorter in proportion to body length than is the case with babies born at full term. It is thin and the skin is wrinkled into folds, subcutaneous fat being markedly deficient; lanugo hairs are much in evidence and the nails of the fingers and toes are not fully developed usually. It lies very quiet, practically motionless, and if made to cry, its voice is weak and feeble. Its breathing is scarcely perceptible and it may be subject to recurring attacks of cyanosis on account of its respiration being disturbed.

The premature infant is not simply a minor edition of a full-term child. "During the last few weeks of intra-uterine life certain changes occur in the metabolic activities of the foetus, which gradually prepare it for the independent existence it will have to assume after See 11 birth". There is the gradual narrowing of the ductus arteriosus, the development of the central nervous system is being completed so that there may be ready response to external stimulation at full term, inadequate response resulting in insufficient inflation of the lungs and weakening of the powers of sucking, swallowing and coughing. Furthermore, the foetus fixes double the amount of mineral salts and iron during the last three months that it retains during the preceding See 12 six months. Thus it is evident that the premature child is poorly prepared at the onset of life when it has to become adapted to its new

environment, and very often to imperfect development are superadded certain pathological conditions, as premature birth is very often due to disease of the mother or of the foetus. Budin demonstrated the great readiness with which premature infants become fatally chilled, and enunciated the conclusion that the less their weight, the worse they

See 13 bear depression of temperature. Several factors are involved in this greater liability to post-natal cooling of the premature born. The relatively extensive surface area permits greater loss of heat by radiation, as also does the deficiency of subcutaneous fat. Heat production is less on account of the general debility of the child rendering it incapable ^{of} ingesting and assimilating sufficient nourishment and besides the heat-regulating mechanism must be imperfectly developed.

The prevention of prematurity necessitates a consideration of the causes. It may be due to some constitutional disease of the mother - syphilis, tuberculosis, alcoholism, chronic Bright's disease, cardiac disease, or often an acute febrile infection. Or it may be some local uterine disorder such as endometritis or malposition. Trauma in the shape of a fall, a blow, or physical overexertion may be responsible. Sometimes twin pregnancy causes premature birth, and premature labour is usually induced by artificial means in the subjects of contracted pelvis, lung or heart disease, or serious uterine haemorrhage. All these causes are not preventable, but it is obvious that there is great scope for improvement which could be accomplished

by ante-natal care and supervision of the pregnant along with systematic education in the hygiene of pregnancy.

In the care of the premature child, attention must be directed chiefly to suitable methods of feeding, to the avoidance of undue lowering of the body temperature, and the guarding against the risk of infection.

The physiology of the process of digestion in the premature needs further enquiry and research, but it is conceded that the digestive See 14 juices are deficient both in quality and quantity. Heat loss is greater and there is a proportionately large amount of growing tissue, so that the calorific requirement is relatively large where unfortunately the ability to ingest and assimilate is markedly less. So it is easily understood that feeding of the premature is usually a difficult and perplexing problem.

If the baby can suck sufficiently well and the mother's breasts are "easy", its prospects are much better, and it should have seven or eight feeds daily. The adequacy of the feeding can be judged by weighing it before and after feeding, and it is important to ensure that the child should be wakened for its meals. If unable to suck, the breast milk should be drawn off aseptically with a breast-pump and the baby spoon-fed every 2 hours, a special spoon with a pointed beak being very serviceable, or even a pipette may be used. If the child's swallowing reflex has not developed, resort must be had to a stomach-tube, a medium-sized rubber catheter, introduced with the child lying on its back, being suitable. Regurgitation and vomiting are dangerous and may necessitate small hourly feeds, or even attempts at rectal feeding with

enemas of human milk or 5% glucose solution. Feeds should be gradually increased as the baby increases in weight, and endeavours should be made to establish breast-feeding.

If the mother's milk is unsuitable or absent, wet-nursing may be tried, care being taken that the wet-nurse is healthy and free from syphilis and constitutional disease. Artificial feeding is very risky and should be adopted only in extreme necessity. Peptonised milk in 1 to 4 dilution may be given two hourly in 2 drachm amounts. Whey is a most suitable food. Buttermilk is sometimes recommended.

Too great care cannot be taken to prevent the body becoming unduly cooled, and this care should be diligently maintained from the moment of birth. The difficulty is not so much the application of artificial warmth as the conservation of the natural heat of the body and the prevention of heat-loss. The infant should be wrapped in a warmed "receiver" and placed before the fire or between hot-water bottles. Its bath, if given, should be at a temperature of 110° F, but for the first few days it can be omitted with advantage, although particular attention should be paid to the toilet of the eyes and the cord. It may be rubbed all over with warm sterile olive oil, wrapped in cotton wool and loose clothing put on. Clothing and diapers should be changed quickly and feeding should be performed with the minimum of handling. It should on no account be allowed outside for several weeks, even for christening.

In the average household the best receptacle for it is a large

clothes basket lined with flannel. As a source of heat fairly uniform and continuous, four earthenware mineral water bottles with hot water and well wrapped up are placed in the bottom in rectangular formation and covered over with heavy bedding. One bottle is refilled every hour in rotation. A light blanket may be placed over the basket leaving an opening opposite the child's head. This method is cheap, but it demands more attention and intelligence on the part of the attendants than an incubator.

Incubators may be simple and home-made, or elaborate and equipped with many refinements. A simple one may be made from a deep wooden box of suitable length and width. A false bottom, incomplete for about 6" at one end, is put in for the bed to rest on. In the compartment underneath this, hot water bottles or other source of heat are placed; one end is made to open as a door and numerous small air-inlets are made into it. Over the box a glass lid is placed and in one corner of this a duct provides exit for the impure heated air. A thermometer is placed inside the chamber so as to be visible through the lid, and it is easy for the attendant to keep the baby and the thermometer under observation.

The incubator may be a very intricate and expensive affair with aluminium tray, moveable hood, a system of electric bulbs to regulate the temperature to an exact degree, and an arrangement for keeping the air at a proper and constant humidity. Such incubators do not require watching and are suitable for use in maternity hospitals and infant

hospitals, although in the latter special rooms may be set apart and maintained at a temperature of about 80° F. This latter plan seems too expensive unless for a very large institution where there is a constant stream of prematures and it is possible to maintain several rooms at different temperatures.

In these various methods the temperature is capable of being regulated, and as the temperature of the child approaches the normal, the temperature of the chamber should be gradually lowered to the room temperature, when the special contrivance can be dispensed with. If the child becomes chilled, the best treatment is an immediate hot bath at 110° F. with the addition of mustard for cutaneous stimulation. The baths may be repeated if the temperature remains at a low level.

"The premature infant is about fourteen times as liable to See 15 die from pneumonia as the infant born at full time". Prophylactic measures consist in keeping the mouth and nasal passages clean, and the observation of strict asepsis in the interior of the incubator and its furnishings. Isolation in a small special ward during the first month would be ideal.

Injury at Birth.

The path of the child into the world is strewn with dangers, and within recent years much attention has been focussed on the occurrence of intra-cranial injuries. In this field has been

accomplished a great deal of very important and instructive research work, the results of which call for a reconsideration of many prevailing methods in obstetrics. By using Beneke's method of opening the foetal See 16 skull. Holland has demonstrated the unsuspected frequency of cranial traumatism at birth, it being present in 48% of his fresh still-birth foetuses, and he has clearly explained the mechanism of excessive cranial stress in the production of tentorial tears with consequent subdural haemorrhage. The causative injury may in its turn result from the maternal passages during spontaneous delivery, as well as from instrumental or manual manipulations during artificial delivery. In spontaneous delivery it is due to spacial disproportion between the foetal head and the maternal pelvis, usually a deformed pelvis, or to abnormal presentation, or precipitate parturition, or in premature birth, the predisposing fragility of the cranial vessels and dura mater. In artificial delivery the harm is done by the forceps, or in breech and transverse presentations, by the manual assistance.

In instrumental delivery, two all-important points should be constantly kept in mind. First, the blades of the forceps should always be applied to the transverse diameter of the head as truly as possible without any regard to its relative position to the pelvis. This ensures the minimum amount of compression of the foetal skull, the maximum resulting from antero-posterior application. Secondly, the amount of compressive force applied through the blades of the forceps should be carefully regulated. If the two handles do not approximate after the

blades are in position, they should be steadied in that position. This is conveniently done by packing in a diaper as a wedge between the handles. Extraction should be slow and intermittent to allow gradual moulding, and the various pelvic planes should be followed. Long continued compression is much safer for the child than sudden compression, and so rapid extraction is very dangerous to the child in cases of any pronounced dystocia. Brute force should never be necessary.

With the greater prevalence of instrumental interference in modern obstetrical practice, one is inclined to fear that the risks of injury to the child are multiplied. "If the forceps is responsible for the saving of many foetuses, it is also responsible for the unnecessary death ~~of~~ injury of many others; it is used too often and on the flimsiest indications" It is to be feared that usually the chief indication is impatience on the part of the mother or the doctor, and that too often the foetus is regarded by the accoucheur merely as a bye-product. A certain proportion of birth injuries is unavoidable, but surely a great reduction would be obtained if the use of forceps was limited to cases with some definite and justifiable indication. High forceps operations are attended by a large foetal mortality, and should on no account be attempted when other methods of choice are available.

Eardley Holland's contribution on Breech Presentation is revolutionary. Tearing of the tentorium ^{is found} in 75% of dead foetuses delivered by the breech. He believes that it is entirely wrong to

hasten the delivery of the aftercoming head, and that breech foetuses are killed, not by cord compression but by excessive cranial stress. The foetus can live for some time (up to 10 or 15 minutes) on its tissue - reserve of oxygen, and he advocates slow and gradual delivery of the after-coming head, preceded by episiotomy to relieve the rigid vulvar ring and perineum.

His conclusions call for some criticism. Experience teaches that the after-coming head is held up by the pelvic brim or an incompletely dilated cervix, and not by the rigid vulvar ring which is usually well stretched by the passage of the shoulders and, if manual help is being given, by the accoucheur's left hand. He bases the duration of the apnoeic period on the behaviour of the child under the influence of Scopolamine morphine anaesthesia. Here the child's air-passages are clear and unobstructed, whereas in normal labour the child, by premature respiratory movements in response to deficient intake of oxygen from cord compression, or to the external stimulation of the manipulations or of cold air on the skin, aspirates liquor amnii, blood or mucus, which blocks the air-passages. "While a child may live for five minutes after its placental circulation is cut off, it is generally endangered, and may die later of atelectasis, pneumonia, sepsis, See 17 or the results of profound asphyxia" A delay up to 10 or 15 minutes is excessive, and it is questionable how much additional moulding of the after-coming head could take place during the extra time. With even five minutes' delay in the delivery of the after-coming head the

foetal life seems to be in much danger.

The logical conclusion to arrive at from a study of the injuries due to excessive cranial stress is to have as few breech presentations as possible, moulding in the vertex presentation greatly relieving intra-cranial compression compared with the sudden compression, usually inevitable, of an after-coming head in breech cases. Convert all breech and transverse cases into head presentations a fortnight before term by external version and apply steadying pads and binder.

In breech labour the cause of death occasionally is spinal injury, fracture or dislocation at the occiput. This may be due to too strong traction on the trunk, to the path of the pull not coinciding with the axis of the trunk, or forceful rotatory movement of the trunk when the head is fixed as in attempts to sweep off a nuchal arm.

Clinical Symptoms:- In the new born babe suffering from intra-cranial haemorrhage, symptoms of cerebral pressure are usually evident on the first day. It may be restless, cry continuously without being able to be pacified, refuse to drink or be unable to swallow; Or nothing unusual may be observed for two or three days, when asphyxia may occur on account of the gradually increasing pressure from a small and continuing haemorrhage. The child may become drowsy and gradually pass into a condition of coma. Or convulsions may also develop, involving all the muscles of the

body, or there may be only local twitchings.

Diagnosis:- If the baby's behaviour and general attitude do not appear quite normal, the attendant should give it a thorough examination for any signs of cerebral injury. Restlessness, persistent crying, undue somnolence, refusal of food or inability to swallow, or the occurrence of asphyxia should put him on his guard. The pulse would be of a high tension and the heart sounds strong and slow. Useful diagnostic measures would be lumbar puncture for the presence of blood, and ophthalmoscopic examination for retinal oedema or haemorrhage.

Treatment:- All cases are not fatal and if symptoms are not quite definite, expectant treatment is to be followed. The infant should be kept quiet and undisturbed, cold applications placed on the head and the body maintained at a good warmth. Lumbar puncture may be ameliorative by relieving pressure on vital cerebral centres. To encourage clotting, calcium lactate solution may be administered per rectum, or haemostatic serum injected.

If the symptoms are definite and undoubted, surgical interference should be at once undertaken - trephining for the relief of pressure, and if the haemorrhage is in the anterior fossa, the clot should be cleared out as is Cushing's practice, but unfortunately the haemorrhage is most often inaccessible.

In the prevention of intra-cranial injury, the foetal head should not be subjected to sudden or excessive stress. In cases of marked disproportion between head and pelvis, forceps operation with brute force should not be attempted. Where the disproportion is slight and forceps are used, the extraction should be very slow and gradual and patiently performed. Like high forceps, induction of premature labour for cases of contracted pelvis should go out of fashion among obstetrical procedures. Not only is the premature babe very susceptible to undue cranial compression, but, with a live birth, there follows the difficulty and anxiety of rearing. In these days of aseptic surgery, Caesarean Section is very successful and safe when the expectant mother has not been interfered with, and the operations of pubiotomy and symphysiotomy could be performed more frequently with benefit. To give these their necessary opportunity, systematic antenatal examination is necessary, when indications for these operations would be detected and mal-presentations could be rectified by external See 18 version or the employment of Buist's towel-pads and binder.

It is generally recognised that there is need for revision of existing methods of the teaching of obstetrics in medical schools. A grave responsibility for two lives rests with the obstetrician, and it is imperative that he should be properly equipped for his duties in this branch of medical practice. Of course, in discussing the sins of omission and commission of the practising accoucheur, it is but fair to bear in mind the inconveniencies and disadvantages under which he has

often to do his work and meet emergencies. Often he has only inefficient help or none at all; he may need to perform his duties in a badly-ventilated and ill-lit room on a low squalid bed; often he needs to placate an unreasonably impatient woman and her importunate friends; after a weary and night-long vigil he may be faced with a critical emergency; and he often has to circumvent some unexpected complication under great nervous tension. There would be no excuse for lack of skill and ignorance among qualifying accoucheurs if fuller use were made of the clinical material available in maternity hospitals, the teaching being made more intimate and practical in character, and a higher standard being required at examination. The foundation for successful obstetrics should be laid during the undergraduate period, and not by blunder after blunder in general practice. Midwifery is the oldest branch of medicine, and from comparative neglect its importance is emerging more and more into the lime-light of preventative medicine.

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PART III.

PREVENTION

Prevention in General.

In discussing the preventive measures for the reduction of mortality during the first week of life, we must first consider whether the existing child-welfare machinery instituted to a greater or less extent all over the country is of any use, and if so, in what directions. Few ante-natal clinics are established in this country, and outside these and some maternity hospitals, not much ante-natal work is carried out except in an unsatisfactory and unintelligent manner in general medical practice. Provision of cheap or free meals to expectant mothers by Public Health Authorities is within the scope of ante-natal practice.

Infant Welfare Centres are of no use to the baby during the first week of its existence. Its attendance there is inadvisable as well as impracticable. Nor is the Health visitor of much use. She usually undertakes the supervision of the baby about the 12th day, when the midwife's duties cease. It would not be good policy for her to pay her first visit early on, say on the second day, on account of the prejudice of the presiding midwife who would consider it an unwarranted encroachment upon her sphere of work. Besides, under the present system of notification of births it is not possible for the

responsible authorities to instruct their Health visitors to attend on the second day. The Notification of Births Act 1907, gives a limit of 36 hours for the birth to be notified, and it has been the experience in most parts of the country that the majority of births are not notified within this time. This is the only means Health Authorities have of learning the "whereabouts" of the new babies and their time of arrival, and if municipal action has to have any chance of reaching the babies straightaway, it is advisable that some alteration should be made in the N.B.Act. Reducing the time for notification to 24 hours could be no hardship, and the Health authorities could make greater use of their compulsory powers to ensure regular notification. Municipal action, to achieve the most beneficial results is dependent on prompt notification. Another unsatisfactory feature in the N.B.Act should be amended. The doctor should be relieved of the duty of notification. At present he is made responsible for the father's neglect.

As to the confinement itself, the question at once obtrudes itself as to what extent the mortality of infants can be influenced by the conduct of the case by a doctor or by a midwife. With the doctor present, emergencies are tackled at once, but it is generally admitted that there has been an enormous increase of instrumental interference in modern obstetrics, the proportion

of
/forceps cases in general practice being much in excess of that in maternity hospitals with their difficult labours. This excessive use of forceps undoubtedly leads to increased incidence of injury at birth. The easy labour is often converted into a difficult one, and the foetal skull is subjected to unnecessarily sudden and severe compressive forces with consequent tears and haemorrhage. It is now being realized that forceps are good servants, but extremely bad masters.

Furthermore, consideration of doctors' cases in general practice cannot be dissociated from the ministrations of the all-pervading handy-woman. Too often she is an ignorant and untidy woman, who is self-satisfied and recognizes no limitation to her "skill". Engaged with the doctor for a case, she is often unavoidably left in sole charge and has no hesitation in dealing with complications and emergencies, unlike the midwife, who is compelled to call in medical aid. Besides, her personal uncleanliness and ignorant and reprehensible methods must prove dangerous to the child as well as to the mother, for now it is being realized that sepsis may be responsible for a far greater mortality in early
See 19. infancy than has hitherto been suspected. * Thus

the activity of the handy-woman is a factor to be included in considering the midwifery work of the general practitioner.

The certificated midwife, on the other hand, adopts the

"expectant attitude" with her confinements. Nature is allowed her own time and way, but the midwife may be suddenly confronted with a severely asphyxiated baby, a case of atelectasis or birth-injury, with no medical help within call. She is compelled to summon a doctor in her difficulties, but he is not always on the spot. Even with this in mind, one must come to the conclusion that the child's prospects of survival are much better with the midwife than with the doctor, who too often is associated with a handy-woman.

This leads up to a discussion ^{on} of what direction the best results are to be expected from in the future. Wide-spread propaganda is certainly needed among practising doctors about the unnecessary risks to the child, and also to the mother, from excessive use of forceps, and the importance of ante-natal examination of the pregnant and rectification of mal-positions and mal-presentations, with the advantages accruing to the accoucheur therefrom. Also, as mentioned before, the education of the medical student in obstetrics needs re-modelling. It is not only a matter of devoting more time to this subject, but a revision of existing methods of teaching is overdue. The supervision of ²⁰ 15 cases of child-birth cannot be expected to produce a competent and reliable accoucheur. Every opportunity should be afforded the student to observe the conduct of complicated and difficult labours in the maternity hospitals, and much more extensive use for teaching purposes should be

made of the material available in the maternity wards and out-patient departments. At least three months' time should be devoted to maternity and gynaecological work, and opportunities should be afforded to gain experience in ante-natal conditions. The endowment of lectureships on ante-natal work is most necessary, and arrangements should be made with Local Authorities so that students can receive a large part of their training in this branch of preventive medicine in municipal clinics. It seems strange that these, with all their scope and facilities for practical demonstrations, have not so far been put to effective use to equip the medical student for his future duties. In this way the medical schools would produce more efficient obstetricians with wider ideas of their work, the standard of midwifery throughout the country would be raised, and future benefit would be manifested in the lessened rates of mortality and morbidity, both foetal and maternal.

The question of the handywoman is difficult of solution. It might be suggested that she should be registered annually with the municipal authorities, who would thus be able to inspect her periodically and keep her under control. This would be wholly unadvisable. It would give recognition and consent to her position and encourage the perpetuation of her kind. The only remedy is total elimination of the species, and this would be easily accomplished if doctors, conscientiously recognizing their responsibility to the full, would refuse to

countenance her assistance by taking engagements only if a certified midwife was also engaged. To meet this contingency, maternity benefit under the National Health Insurance Act would probably need to be increased and extended to cover all confinements. Good maternity nursing during the puerperium is of the utmost concern to the health of mother and child, and that doctors should allow this to be undertaken for their cases by any woman chosen by the mother is a deplorable practice. Trained help is necessary and would result in quicker recovery of the mother and better safe-guarding of the subsequent health of mother and child.

Undoubtedly the appointment and work of the Central Midwives Board, instituted by the Midwives Act 1902, marked a great advance on previous conditions and have resulted in increased efficiency of midwives. In recent years there has been a growing tendency among general practitioners to relinquish the drudgery of midwifery work. In 1919, midwives managed 50% of the births in London and 70% in the County Boroughs, in some of which in the North they attended See 20. over 90%. * Unfortunately there has been no proportional increase of properly-trained midwives. In 1920 in England and Wales, 12,885 midwives gave notice of intention to practice out of a total of 45,960 on the register, 80.6% of these were certificated and 19.4% uncertificated. Too often the G.M.B. certificate is taken only as an additional qualification by

nurses and health-visitors who have no intention of doing midwifery work, but it is very satisfactory that the number of registered midwives without certificates is gradually becoming less. with their present training midwives are capable of dealing only with normal labour cases, but without doubt many with much experience are quite able to tackle many abnormal conditions which may result in saving the life of a mother or child. With assured economic position and prospects, the calling of maternity work would certainly attract better educated and more intelligent women, and it should be possible to train them to treat competently many complications and take full responsibility in many emergencies. The Central Midwives Board is satisfied with too short a training, -six months for anyone with no experience and four months for a trained nurse. Consequently the standard of knowledge and skill expected is too low, and this should be raised by extension of the training period, improved teaching and the adoption of some system of post-graduate training for practising midwives. Midwives require two years' training in France, Italy, Denmark, etc., and the same provision, or something approaching it, could be made in this country. Under the C.M.B. rules, midwives are responsible for their patients after they are engaged, but they are untrained in ante-natal conditions and incapable of detecting abnormalities of pregnancy. with a two years' training in large maternity hospitals they could be made

proficient in this as well as in infant hygiene, and competent to deal with most of the complications of labour that the average general practitioner tackles. It might be objected that this would produce, and give recognition to, an inferior type of doctor. There is the precedent on the continent, where two years' training is necessary for the practise of midwifery, and, besides, the increasing tendency of doctors to refuse midwifery work must be countered by increased efficiency on the part of the midwives. Their number also must be increased and this brings us to the question of how sufficient women of the proper type are to be attracted to undertake this work.

The cost of professional training should be free, or at least subsidized, and the subsequent remuneration and status should be assured and sufficient. This could be best accomplished by a system of municipal or county midwifery service. The training would be carried out at existing recognized schools for midwives or in institutions under the direct control of the county or borough councils. The Ministry of Health would repay 50% of any subsidies advanced by the Councils, and the Board of Education might offer grants or scholarships. Pupils admitted to training would need to undergo a medical examination to ensure that they were physically fit for their future duties and to sign a contract to serve under the council for a certain period after expiry of their training in whatever part of the county or town to

which they were allotted. The Council could arrange to pay a fixed salary and retain the fees; or guarantee a minimum income and midwives keep the fees earned; or pay a definite sum yearly and midwives keep the fees. Under the Midwives Act, 1918, the doctor's fees are guaranteed and it should be amended to safeguard the midwives' work also. In the case of the poor who were unable to pay, the council could make up the fees to the recognized amount. The Midwives Act should also be amended so that authorities could at their discretion pay a reduced rate of salary to midwives compulsorily restrained from work on account of infection having occurred in their practice. Extra remuneration would be given in consideration of ante-natal work done, and the adoption of a pension-scheme would be a great attraction.

In these days of financial stringency and all-round economy, such schemes would be sure to be opposed on the ground of expense, national and local. Certainly the expense would be enormous, but so also would be the benefits. Surely no greater national economy could be conceived than the saving annually of thousands of new-born babies with all their potentialities, mental and physical, and by spending time and money on midwives, the results of recent research work clearly indicate. We shall be working along the most hopeful and fruitful preventive lines. This would prove the most certain way of co-ordinating the midwifery service to ensure getting the best results out of the midwives' work and

securing their services for the much needed ante-natal work. The advantages are manifest. More satisfactory and conscientious work would be done by a satisfied service with their fees standardized and their livelihood guaranteed. Control would be more complete and central, and midwives would cherish a definite and direct connection with some maternity hospital, also under municipal control. Ante-natal supervision would receive a great impetus - the midwife is already the confidante, friend and adviser of that section of the community which is responsible for the greatest part of infant mortality and is probably in most need of pre-natal care. The rural districts could be much better served and the problem of no doctor being available at the critical moment would nearly reach complete solution.

As an alternative, national midwifery service with state-paid "free" midwives might be suggested. Without doubt the working of such would prove very difficult and intricate, and to judge from the N.H.L. Act, far too cumbersome and expensive, with a tendency to discourage initiative and estrange that personal relationship which is all-important and necessary in this sphere of work.

Institutional Confinement:

Midwifery service cannot be expected to attain to its highest level of improvement without some provision for institutional confinement. Ideally every labour case should be conducted as if it were a major operation, but this would necessitate practically every confinement being performed in a properly equipped maternity home or institution. The advantages of that to both mother and child are manifest. The mother would be confined under the most hygienic conditions, skilled medical and nursing attention would be given, and she would be ensured of sufficient rest, quiet and freedom from petty worries for two weeks after child-birth. Besides, in complicated cases the advantages would be immense. The infant would get a start in life on the right lines. It would receive no night-feeds, there would be no over-feeding, and it would escape the inevitable and usually unnecessary doses of castor-oil. Also, it would not be subjected to much well-meaning but misguided attention from interfering relatives and neighbours.

The objections to institutional confinement for all are insurmountable. Most women object to enter an institution for normal labour, and the idea would be engendered that child-birth was such a dangerous proceeding that safety was to be secured only by entering an institution with consequent effect on the birth-rate. The cost would be prohibitive, and

the Institutions could not be worked on a self-supporting basis. Arrangements would need to be made to look after the rest of the family, during the mother's absence, either by boarding out the rest of the family or the employment of "home helps". Moreover why should parents be saved all the inconvenience connected with child-birth? Their responsibilities should be made more manifest to them, not moved on to the shoulders of others.

Institutional confinement should be available for all cases of abnormal labour, and these would be reduced to a minimum by systematic ante-natal supervision and treatment. The doctor is called in for emergencies in 8 - 10% of the See 21. cases in large towns * and probably only a part of these would need to be admitted to a maternity hospital for their confinement. In towns this could be easily managed by reorganization of existing maternity institutions. Expensive buildings and equipment should be necessary only for abnormal cases. Accommodation needs to be found for women whose home conditions are inadequate or unsatisfactory, generally in overcrowded and insanitary areas. Shortage of accommodation in the home certainly should be an indication for admission to a lying-in home, but the ground is less sure when dealing with lack of cleanliness. Promotion of cleanliness and provision of the necessary care would need to be urged, and with failure of improvement, the safest course would be

reception into a maternity home. It is, of course, imperative that Sanitary Authorities continue and institute schemes for slum clearance.

In existing institutions, such as maternity hospitals and poor-law infirmaries, good maternity work is being done, but the great defect in maternity and poor-law institutions, in view of the requirements that should be expected from them, is the want of any system of "following-up" the mother and child. The importance of this is seen in cases of premature birth. Also, no ante-natal work is attempted by poor-law infirmaries, and a variable amount, usually very little, by maternity hospitals. There is also a lack of co-ordination between the work of the midwives and the maternity hospitals, and the hospitals offer no opportunities for post-graduate training to the midwives. The best way to remedy this and centralize control is for all maternity institutions, except private maternity homes, to be under the management of the municipal authorities. Support by voluntary subscriptions has built up and carried on marvellous institutions in this country, but the necessary and adequate expansion of maternity hospitals cannot be expected from voluntary subscriptions. It is inevitable that the mother and her infant, unborn and newly-born, shall pass under some form of control sooner or later. The care of the insane in asylums, the fever cases in isolation hospitals and the tuberculous in

sanatoria are all under local control, and gradually the public is being educated that all is not right with present-day midwifery practice.

Necessary adjuncts, beyond the wards, labour-rooms and usual accommodation, must be incorporated in the organization of the maternity hospital. Of these, the most important is the pre-maternity ward, as devised and inaugurated by that pioneer, the late J. W. Ballantyne, in the Edinburgh Royal Maternity Hospital for the observation and treatment of the diseases and complications of pregnancy, such as eclampsia, excessive vomiting, heart disease, nerve maladies, etc. The nurse in charge of this should have medical and surgical experience and the C.M.P. qualification. An isolation ward would be necessary, as also would a venereal disease one. A separate ward with incubators would need to be maintained for premature infants. Here they could be scientifically dieted, depression of the body temperature avoided, and they could be guarded against the risks of infection, especially pneumonia. It would be a great advantage if a ward could also be provided for infants suffering from marasmus, for these, to improve, usually need to be removed from home influences. In the external department would be the all important ante-natal or maternity clinic, acting as a sorting house for these various wards. To be up-to-date, laboratory

accommodation would need to be found in order to take advantage of the available material for research and to do the routine work.

Maternity hospitals are found in the cities only, and could not offer accommodation to all necessary cases. They would be sufficient to supply their own neighbourhood. In cities and large towns the maternity hospitals would be supplemented by more use being made of existing poor-law infirmaries, where extra lying-in wards and labour rooms could be provided. These would transfer suitable cases to the premature wards etc. of the maternity hospitals. In large towns with a general hospital but no maternity one, it would be necessary to add a maternity department to the hospital and place it in the care of a matron or sister with the C.M.B. qualification. A consultant obstetrician would be appointed. As subsidiaries, municipal lying-in homes could be established in thickly populated districts. These need not be pretentious. Large, well-drained sanitary houses, capable of taking in 15 lying-in women would be satisfactory. These would be presided over by nurse-midwives and it might be arranged for pupil-midwives to spend part of their training there. In smaller towns with no general hospital and in villages, similar lying-in or maternity homes would be provided. Each one would be placed in a convenient centre of easy access, would have a motor ambulance, and be placed under the

administration of the local M.C.H.. If the village has a cottage hospital, a small ward of 2 or 3 beds and a labour-room could be added and a nurse with C.M.P. certificate put in charge. In these instances arrangements would exist for the transfer of cases when needed to the maternity ward of the most convenient hospital. Local practitioners would be called in for emergencies, or the lying-in homes could have a free call on the specialist staff of the nearest hospital.

Maternity or Ante-natal Clinics:

Lack of proper care of the mother's health during pregnancy, especially during the later months, is responsible for the death of uncounted thousands of infants. The causes affecting the pregnant woman's well-being may be personal or social. Ignorance of the hygiene of pregnancy is widespread. There is no educational machinery to combat it, and apathy and indifference are far too common. Poverty is a serious factor, and with it go poor living conditions, overcrowding and very often exhaustion from over-work. Fighting year in and year out against destitution and want, the mother of the poorest class is unable to avail herself of the opportunities to prevent or cure disease. Innate reserve and modesty often stand in the way. The whole subject of pregnancy bristles with difficulties and generally the medical

profession has failed to realize the significance of pre-natal morbidity. Consequently there has been no united effort in this direction, a field which is eminently suited for team-work.

The old saw - "An ounce of prevention is worth a pound of cure" - has a very apt application here, and the establishment of ante-natal or maternity clinics with their co-ordinated machinery is the key to the problem as far as medical responsibility is concerned. The healthy mother is most likely to beget healthy children, and the social conscience must be aroused to the need of preventing the appalling wastage of infant and also maternal lives. The period of pregnancy is a severe testing-time for a woman's physical and nervous condition, and she should be under constant supervision of a doctor or properly trained midwife during this time. It would be made easier for things to go right than go wrong. The public should be educated to realize that pregnancy can usually be freed from discomfort and illness, that labour can be made safe, convalescence rendered rapid and complete, and conditions made favourable for the healthy growth and normal development of the child. Care and instruction of the mother should be given before the birth of the child, rather than only afterwards. Her natural repugnance to examination should be overcome and she should

be shown the benefits of prenaternity care.

The work of the maternity or ante-natal clinic involves the education of the pregnant woman in the hygiene of pregnancy, her systematic and careful examination and supervision, so that abnormal conditions may be detected early and appropriate preventive measures adopted in good time. Thus would be lessened the likelihood of serious complications for mother and child during pregnancy and at child-birth. A thorough physical examination of the expectant mother, not only an obstetrical examination, should be made and thus her general condition would be determined. Its usefulness would be found to have special application to syphilis, prematurity, presentation of the foetus and marasmus.

The routine work of the clinic may now be sketched in more or less detail. At the consultation the medical officer gives a complete physical examination and ascertains the condition of the heart, lungs, digestive system, etc. and the general health. A thorough obstetrical examination is performed. The "lie" of the foetus is noted, as is also the presence of any tumours, or any undue thickening of the cervix or its neck. The foetal heart-sounds are auscultated, and the presentation of the foetus made out. Pelvic diameters are measured, and during the last month a rough idea is obtained if there is any special disproportion between

the foetal head and pelvis. The blood pressure is taken, and a specimen of urine examined for albumin and sugar. An up-to-date clinic would have a small laboratory attached, where in cases of albumin found in the urine, estimation of the blood urea and urea concentration tests could also be carried out. Specific history is always enquired into, and in doubtful or suspicious cases a Wassermann reaction would be done. If necessary, smears of genital discharges are stained and examined. If no laboratory is at the medical officer's disposal, arrangements would be made to have this work done at the laboratory of the nearest maternity hospital.

An important part of the work of the maternity clinic would be its function as a clearing-house. The cases would be grouped. Normal cases from clean homes would be delivered by their own doctor or midwife. Abnormal cases of pregnancy would be transferred to the prenaternity ward of the nearest maternity hospital for treatment and subsequent delivery. Those with insufficient or unsatisfactory home accommodation would be referred to a lying-in home for their labour.

The endeavour would be to keep the pregnant under constant supervision during the whole period of their pregnancy, and to educate the public that supervision is necessary from the first month. Normal cases would be asked to attend once a month up to the seventh month and then fortnightly till term. They would be instructed to attend oftener and at once, if any unusual symptom

supervened. Abnormal cases not needing institutional treatment or investigation would be expected to be examined as frequently as might be necessary. As soon as they understand that attempts are being made to prevent what doctors are called in to put right, and to make labour easier for them, their regular attendance could nearly always be depended on. Full particulars of every case would be entered on the antenatal case-sheet. This would be indexed for easy reference, and would be sent to the maternity hospital with those transferred for indoor treatment.

A decision must be arrived at on the vexed question of whether treatment should be carried out at the clinic or not. As mentioned previously, the general practitioner has had no special training in the discomforts and diseases of pregnancy and their therapeutics, and usually adopts a "laissez faire" policy with the pregnant. If he cannot find time to make himself proficient in this branch of his work and to examine his pregnant patients systematically, he should not object to the State or Municipal Authorities arranging for it being done for him. Certainly cases requiring in-door attention should be recommended direct from the clinic in order to circumvent the trouble, worry and delay usually connected with attempts to gain admission to an institution. The treatment of minor ailments, however, is on a different footing. The

clinic cannot achieve the maximum of its usefulness if it works in a watertight compartment. It must co-operate with the general practitioner and the midwife on the one hand, as well as with the maternity home and hospital on the other. With cases sent by the midwife, acknowledgment should be made by letter and what is necessary in each individual case indicated. If treatment of some minor trouble is needed and the patient has a private doctor, he also would be corresponded with and full details given of the treatment advised. If the patient has no private doctor, the medical officer of the clinic would undertake treatment. When a doctor referred a case, similar acknowledgment would be made and details of the treatment recommended would be given. In this way, instead of showing a spirit of indifference or animosity to the ante-natal clinic, local doctors and midwives would in all likelihood soon learn its uses and take advantage of it, but it is conceded that a great deal depends on the skill and tact of the officiating medical officer. In his correspondence with local practitioners, the necessity for regular supervision would be indicated. They would be asked to co-operate in this and advise their patients accordingly. If on subsequent examination it is found that the recommendations were being disregarded, it should be within the medical officer's power to undertake treatment.

Pelvimetry:-

Of prime importance among the medical officer's

duties is pelvimetry. In every case the measurements must be taken and recorded. As a minimum, the external conjugate and diagonal conjugate diameters must be measured. If the external conjugate is 7" or less, full internal measurements must be made to determine the exact type of contracted pelvis - generally contracted, flat rachitic or other type. The examiner should not be bound by rigid rule-of-thumb in his pelvimetry, but should rely chiefly on the relative size of the foetal head and pelvis. If any spacial disproportion is revealed, he must then and there decide what form the labour is to take - forceps delivery, induction of premature labour, perhaps podalic version in minor degrees of flattened pelvis, or Caesarean Section. Podalic version should be ruled out on account of the risks to the child, but unfortunately it is still practised. Induction of premature labour should not be advised to be done before the 36th week, if the premature child is to have a fair chance of life. If relative disproportion is diagnosed with accuracy, there should be no hesitation in recommending Caesarean Section. With this, the foetus' prospects of survival are much enhanced, while the maternal mortality would probably be no greater and certainly there would be a decided reduction in maternal morbidity. Distressing and anxious forceps cases, accompanied by the exercise of brute force, should be things

of the past where routine pelvimetry is carried out carefully.

Rectification:-

Mal-positions and mal-presentations are discovered, and in their diagnosis chief reliance should be placed on abdominal palpation, rather than on vaginal examination. Sutures and fontanelles are not always easy to define, although the detection of an ear is conclusive. Mistakes may be made even by the skilled, and radiography, if practicable, would be of great help. It is questionable if the position or presentation should be corrected before the 34th week, as previous to that the foetal position is not stabilized. Rectification into the requisite occipito-anterior position may be by external cephalic version, under See 22. chloroform, if necessary, or by Buist's towel-pads and binder.*

Venereal Diseases:-

whenever the medical officer is suspicious of the presence of syphilis in the pregnant, he should have a Wassermann test done, and if a positive reaction is given, he must immediately apply energetic anti-syphilitic treatment. See 23 Holland's findings* that only 16% of still-births died from syphilis removed this disease from the unenviable position it held of being responsible for the vastly overwhelming majority of still-birth mortality. This does not include miscarriages and deaths during the first few weeks of life, and it is most probable that the death-rate from syphilis

would reach a much higher percentage if the whole ante-natal See 24. and neo-natal periods were included. Williams * has demonstrated that treatment of maternal syphilis gives very encouraging results. Mothers with a positive Wassermann and having no treatment gave birth to 48.5% syphilitic infants; where treatment had been insufficient, 33.2% syphilitic infants were born; with good treatment, the percentage was 6.4. The important point is diagnosis early in pregnancy and the immediate institution of thorough treatment. If the women attended the clinic before the middle of pregnancy foetal death from syphilis should be practically abolished.

In order to be taken full advantage of, this treatment would need to be carried out at the ante-natal clinics, where separate sessions would be arranged, and not at the v.D. clinic. The greatest drawback would be the inability to get hold of the cases early on in pregnancy, but this might to a large extent be overcome if the co-operation of the v.D. officer could be secured. This certainly would be a violation of the privacy of the work of the v.D. clinic, but surely an amendment of the v.D. regulations could be effected for some relaxation of the privacy in this direction in consideration of the aims and the results to be achieved.

Toxaemias:-

The toxaemias of pregnancy would occupy the greatest

part of the medical officer's time, and it is in these that systematic ante-natal work should be productive of its best results in the future. Among the results of pregnancy toxæmias are included eclampsia, nephritis, pernicious vomiting, many abortions and premature births, and probably many of the hæmorrhages. The presence of albumin in the urine of the pregnant woman is a danger-signal never to be neglected, and every such case should have thorough and careful investigation. The blood pressure must be reckoned, and if it is higher than 150 MM, another warning is present. The blood urea must be estimated, and the urea concentration test done to ascertain the renal sufficiency or deficiency. Constipation is enquired into, and the teeth are examined for the presence of caries or pyorrhæa.

In severe cases, rest in bed is indicated and these would be transferred direct to the prenaternity ward of a maternity hospital. Possible sources of toxin poisoning must be searched for and all septic foci removed. Medical treatment aims at the elimination of the toxins from the circulation. Fluids, especially alkaline ones, must be drunk in large quantities. The diet should be protein-free, and in cases of persistent vomiting, reduced to a minimum, except when this is due to a neurosis, when isolation and lack of sympathy soon effect a cure. The bowels must be regulated,

Liquid paraffin may be given, or enemata administered. In severe cases, the intestines may be washed out regularly with alkaline solutions, or even there may be need of alkaline saline transfusions. If the blood pressure is high, venesection may be resorted to with advantage. Cutaneous elimination would be encouraged by baths, radiant heat and packs.

It is in this field that an immense amount of research work is called for. Well-equipped laboratories in connection with maternity hospitals should be established and adequately endowed. Expert laboratory workers should be employed, and the material from the pre-maternity wards and ante-natal clinics would be available for their investigations. The products of conception in all cases of abortion, premature labour, and still-birth should be forwarded for their use, and it would be an immense help if compulsory registration of these was enacted. The practical application of the knowledge thus gained would bear great results in the treatment of toxæmic conditions, and the public should be educated that such investigations are essential if the maximum benefit is to be obtained from ante-natal work.

Dental Treatment:-

A separate dental department added to the clinic might be considered an advantage. Carious teeth could be "stopped" or extracted. Much prejudice would need to be overcome,

and the public would need to be taught that dental operations are safe during pregnancy, and that gas is not dangerous. Artificial dentures might be provided when necessary, and cases of pyorrhoea treated with mouth-washes and vaccines, etc. If the patient was able to pay, full fees should be charged. If not, part payment at least should be obtained. A grant from the Exchequer should be available for this scheme, but even with that the cost would be prohibitive. A scheme for dental work among the pregnant would have a more favourable reception if arrangements would be made to have it performed by local dentists, or at the school dental clinic or an hospital department.

Conservative dentistry is a new idea among the poor and much educative as well as remedial work needs to be done. It is true that the proof of the relation of dental infection to general disease depends largely on clinical, not pathological, evidence, but the removal of grossly septic foci and instruction in oral hygiene among the pregnant would result in their improved health and condition to the advantage of the growing foetus.

It is questionable what measure of dental work at the public expense is justifiable. Too much reliance should not be placed on conjecture as to the effect of oral sepsis on the general health. This should be made the subject of

investigation and a balanced opinion formed before a scheme of general dentistry is launched. Undoubtedly, however, attention to gross oral sepsis, due to septic stumps or pyorrhoea, and the provision of dentures for those who are unable to masticate their food at all on account of wide gaps and as a result are poorly nourished, are justifiable, and relief should be afforded to such cases without delay.

Educational work:-

There may be differences of opinion as to whether treatment in any form should be carried out at the maternity clinic, but all agree that its aim being preventive, education in the hygiene of pregnancy is all-important among its functions. Instruction should be given both individually and in groups. Ten minutes for a short lecture by the doctor is quite long enough. The importance and need of constant supervision during pregnancy are emphasized, the benefits to be obtained from regular attendance at the clinic are pointed out, and advice is given on the subjects of diet, exercise, work, sleep, etc. for the pregnant woman. The danger-signals of pregnancy would be indicated. Opportunity would be taken to attempt to dispel much of the ignorance of the laity, such as that any place is good enough for a confinement; that once a doctor or midwife is engaged, nothing more is needed till the confinement. The need for

sex education of the young could also be usefully taught. Various exhibits might be made of baby's clothing, layettes, etc. Instructive pamphlets and booklets could be distributed to those likely to read them.

Structure and Equipment:-

The maternity clinic need not be ambitious or of large size, but may be quite small and inexpensive. In cities they should be multiple and concentrated in densely populated districts where they would be most convenient for the expectant mothers. One clinic for about every 1,000 expected births would be a good indication of the number required. Two afternoon sessions per week would be sufficient. In smaller towns, one clinic with one session weekly might suffice, whilst in villages, one meeting per fortnight would answer the local requirements. The minimum accommodation would be a waiting room and a consulting room with w.c. and lavatory adjacent. A gynaecological couch is needed. The requisite medical and obstetrical instruments are to hand, and a sterilizer is available. A douche can is ready for use if douching preliminary to vaginal examination is considered necessary. Equipment needed to collect blood or urine for examination or to take smears, is also provided. There is a writing table for the doctor and also a card-index cabinet for convenience in locating cards.

Staff:-

The medical officer should be a man or woman with good obstetrical experience, of pleasing personality and capable of much tact and discretion. It is best for him to be a whole-time officer, as then he would be more likely to receive co-operation from the local doctors. In a busy clinic he should have the help of two nurses with C.M.B. qualification, one of whom could undertake any simple dispensing needed and receive the patients.

Home-visitation:-

Home-visitation is an essential part of ante-natal work and without it, maternity clinics would lose a very great deal of their effectiveness. It has been the experience of post-natal work that home-visitation is the only method of reaching a large part of the population, and its value would be more pronounced in relation to ante-natal work. The nurses of the clinic do the home-visiting of the expectant mothers. They have notes of the advice given and the treatment, if any, recommended at the clinic to those who have been in attendance. In visiting these, the notes are made use of and the various points again explained and further emphasised. The nurses fill in cards on which details of home-life and home-conditions are recorded. These are available for the doctor's use and consideration and thus he is enabled to form a more accurate opinion of the need of extra nourishment.

or of rest from work, or the advisability of recommending confinement in a maternity home in instances where the accommodation is insufficient or lack of cleanliness would be dangerous. But "following-up" should be of minor importance in the nurses' work, unless in making enquiries for absentees from the clinic. They should be expected to "break new ground", and their success in this would be a good criterion of their value. They would need to get in touch with new cases, and co-operation with the midwives would be a great help in this. With them, the nurses should be "personae gratae", and for this a practical and intimate knowledge of midwifery would be very beneficial. Their duties are difficult and delicate, and need great courtesy. The innate conservatism of the pregnant woman herself has to be overcome, and the superstitions, traditions and objections of her older female relatives have to be combated. The nurses must exercise much tact and kindness to gain the necessary confidence of the pregnant woman and get installed as friends of the family. Those women who cannot be encouraged to attend the clinic would be visited monthly till about the seventh month and then every fortnight till labour. In these cases the nurses would be entrusted to test the urine for albumin and possibly to record the blood pressure. Skilful visitors would have their visits

and work appreciated, and would guard against causing any annoyance or giving any grounds for the idea that they were intruding on the privacy of the home-life.

Relations with Midwives:-

Due consideration must be paid to the local midwives if any scheme of ante-natal work is to achieve the best possible results. They should be made to feel that they are a useful cog in the machinery of pre-natal activities. If they fetch a patient to the clinic, the medical officer should treat them with respect and courtesy before their patients. If a pregnant woman attends on the recommendation of her midwife, this should be acknowledged by a letter to the midwife including a short note of explanation or of the advice given. Such a procedure would do much to improve the standing of midwives, and would be a great incentive for further dealing and future co-operation with the medical officer and his staff.

Nurses are uninvited and sent by the Local Authority, but midwives have the ear and confidence of the very class of woman that needs to be reached by ante-natal work and, by taking advantage of this, it would be a great step in its advance if the midwives were sufficiently well-trained in ante-natal hygiene and methods to undertake the supervision during pregnancy of their own patients with the medical officer of the clinic to act as consultant. The objection

to this is that pregnant women would be unwilling to pay midwives for ante-natal supervision. This might be overcome by the Local Authorities arranging to pay midwives a small fee, say 5/- per case, for every patient engaging them early on in pregnancy, provided they did a requisite amount of ante-natal work in each case. They would need to keep records of attendances and advice again. These would be examined by the inspector of midwives, and be available to the medical staff of the maternity clinic or of the maternity hospital if the patient came under their care. A better scheme is a service of municipal or county midwives with subsidies for their training, as previously detailed, and the midwives, being municipal officers, would undertake all the ante-natal visiting. The whole machinery of ante-natal work would be centralized in the municipal health office, full control would be secured over all details and the midwives would have their duties well defined and clear-cut.

Early Engagements:-

Engagement early in pregnancy of the doctor or midwife for the confinement is essential if ante-natal supervision and care are to be complete and wholly successful. Notification of Pregnancy would seem to be a solution of the problem of how to get in touch with the pregnant women, but the

objections to it are insuperable. It would tend to suppress voluntary effort. Errors of diagnosis would be most unfortunate and unpleasant - and might lead to expensive litigation. The best section of the community who can afford and are willing to pay for ante-natal work would strongly oppose it on account of the needless infringement of their privacy. For it to be equitable, the duchess would need to be notified as well as the scullery-maid. Otherwise, it would be class legislation. Besides the exact number of pregnant women does not need to be known. It is their "whereabouts" that needs to be found out. Extension of the national Health Insurance Acts to grant Maternity Benefit to those pregnant women who need some form of treatment during their pregnancy would be effective. The medical officer of the clinic could act as referee to decide who were eligible, and its continuance to any particular woman would be contingent on her remaining under supervision and carrying out instructions. This would find those cases which require supervision, they would be better provided to obtain fuller benefit from treatment, and it would appeal to that section of the community, the ignorant and indifferent, which is so difficult to deal with in work of this kind. In the meantime, reliance must be placed on mutual confidence and co-operation between the doctors and midwives on one hand

and the staffs of maternity centres on the other.

The Care of the Illegitimate

The death-rate among illegitimate infants is twice, and three times in some places, as high as that among the legitimate. Here a great deal of preventive work waits to be done, and voluntary social workers have excellent scope in this for their efforts and philanthropy.

The existing laws of illegitimacy should be revised. The responsibility of the father should be made much heavier, the unmarried woman's burden lightened, and the child born out of wedlock should be made legitimate by the later marriage of parents. *(In Scotland this is the law)*

In every district there should be some scheme for taking care of the unmarried mother and her child, both shortly before and after confinement. Hostels and rescue homes on similar lines to the Salvation Army ones could be established. It would be good if facilities could be made for the girls to work for their board, or part of it, and so that they would be able to look after and suckle their babies for some time after their confinement. Such a system of hostels for their reception and confinement would be far preferable to the giving of grants to keep them at home from work to look after the baby, or the provision of foster-mothers to feed the babies during the mothers' absence at work.

The unmarried mother should be freed from the cost of legal proceedings to prove paternity. The Local Authorities might undertake this and also the collection of the allowance from the father.

Conclusion.

In this contribution on infant mortality during the first week of life, its extent and distribution have been indicated, schemes aiming at its prevention passed in review, and emphasis placed on proposals offering the greatest likelihood of ultimate benefit to the newborn and the State. Factors concerned in its causation have been discussed, and particular attention has been given to the immediate causes. But for any scheme to yield widespread and the most successful results, there must be labour in other fields at the same time. General sanitation must be ensured of continued progress, and the social and economic condition of the poor must be improved. There are divided opinions on how ante-natal nurture and work on the part of the expectant mother influence the child, but surely the wisest policy is to give the mother the benefit of the doubt and afford her some satisfaction and comfort during a trying period. Supply the necessitous with dinners free or at less than cost. The help is only temporary for each, but careful selection is needed to prevent this becoming mere charity. The Factory and Workshop Acts forbid employment of a woman within four weeks after child-birth and suggestions

are made that she should be excluded from work during the last month or two of pregnancy. This would necessitate the formation of special pregnancy funds, generously supported by the employers for her sustenance during enforced rest. This would probably tend to discourage the employment of married women with the result of involving many households in poverty and dire distress. Such an unsound economic condition can be ameliorated only by raising the husband's earnings to a family-supporting basis. When discussing rest for the worker during the last months of pregnancy, it must be borne in mind that the unpaid work of the household is often just as heavy and strenuous as that of factory employment.

It is recognized that by far and away the most vital periods affecting first-week mortality are those of pregnancy and parturition, and consequently in this study of its prevention a large amount of attention has been given to ante-natal measures and improvement of midwifery, for the dangers must be detected, their sources investigated and suitable remedies suggested.

What is needed for the future is the better training of medical students and midwives to improve obstetrical practice, the establishment of municipal ante-natal clinics and lying-in homes in sufficient number, the development of a scheme of municipal midwives capable of doing satisfactory ante-natal work, and the institution of a restricted form of

"pregnancy benefit". Control over the whole ante-natal and maternity work would be direct and unified, co-ordination would be complete and co-operation between the different branches would be facilitated to the utmost.

The cost of the general adoption of adequate schemes will be enormous. The aims of the whole endeavour are national and the major part of the expense should be covered by Government grants. But the tendency of legislation in recent years has been to put more and more of local expense on to the local rates. Control of the schemes should certainly be in the hands of Local Authorities, municipal or county, and their powers might with advantage be deputed to a sub-committee of intelligent laymen who have been ^{elected} to the position. It is better to have no co-opted members, as these are often either cranks or nonentities. The sub-committee should have a paid expert to advise them, as the unpaid expert on a committee is uncontrolled and may be a public danger.

In this work it is for the medical profession to institute and pursue research and investigations and formulate conclusions. Then it is for the statesman to adopt and follow any advice that is sound, remembering the soundest economy in spending money is to spend it wisely.

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