usual symptoms that occur, but some variation in type and severity has been noticed in several of the epidemics described.

Infective Hepatic Jaundice.—Hurst and Simpson (1934) showed conclusively that this type differed from the closely allied epidemic catarrhal jaundice. Several epidemics are classified under this heading by Barber (1937), particularly those recorded by Montford (1934) in Leicestershire and Richards (1933) in Derbyshire. The clinical picture is quite distinct from that in either Weil's disease or epidemic catarrhal jaundice. Usually there are no pre-icteric symptoms of any kind. Pale faeces and dark urine occur immediately prior to the appearance of jaundice, which is accompanied by headache, general malaise, occasional vomiting, diarrhoea, and a slight rise in temperature. The liver and spleen are enlarged though epigastric tenderness is absent. The jaundice is less marked but of longer duration than that of epidemic catarrhal jaundice. Convalescence is prolonged and the patient is left very weak. The mortality rate, though low, is higher than that in epidemic catarrhal jaundice. Appropriate tests disclose an hepatic insufficiency, and in the few post-mortem examinations described hepatic necrosis was present.

Simple Catarrhal Jaundice.—Usually of a very mild character and due to a mechanical obstruction of the biliary passages; said to be due to colds, chills, etc., and often occurs in children. The symptoms of this type and of epidemic catarrhal jaundice are very similar, and it is often difficult to differentiate between the two. Owing to the absence of bile the stools in simple catarrhal jaundice are pale and remain so until obstruction to the bile flow is removed. In the epidemic type, although the stools are for the most part pale, an occasional bile-stained stool is passed.

Enteric Group.—Jaundice rarely occurs in this group of fevers, and although the symptoms resemble in some respects those in epidemic jaundice the agglutination tests and bacteriological examination of the excreta reveal the presence of the organisms belonging to this group.

Acute Yellow Atrophy of the Liver.—Of very rare occurrence, particularly in children. The post-mortem findings are somewhat similar to those in infective hepatic jaundice.

Treatment

All the cases which occurred in this epidemic were under the care of the local general practitioners, and treatment chiefly consisted of confinement to bed for a few days and the relief of symptoms.

It was not considered desirable or necessary to close any of the schools involved. Those children who had been in contact with the disease, also the senior children from the affected villages attending central schools, were, however, excluded for several weeks, and it was impressed upon the parents of the former to keep them in strict isolation during the period away from school. The parents of children who had contracted the disease were advised to prevent them mixing with other children until convalescence was complete.

Summary and Conclusions

1. The recent occurrence of jaundice in Leicestershire as detailed above was undoubtedly an outbreak of epidemic catarrhal jaundice and was very similar to the epidemic in the Midlands described by Morgan and Brown (1927).

2. School children principally were affected, and it is estimated that they comprised from 60 to 70 per cent. of the total number of cases.

3. There was no evidence that the disease was spread through the medium of water or milk supplies, or by rats.

4. It is evident that epidemic catarrhal jaundice is spread by close personal contact, probably by means of droplet infection.

5. The incubation period is about four weeks, and children with the disease appear to be infective during this stage.

6. No causal organism was found, though undoubtedly it exists, probably in the form of a virus as suggested in previous epidemics.

I am indebted to Dr. J. A. Fairer, county medical officer of health, for permission to publish the particulars of this investigation.

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EXTERNAL VERSION FOR BREECH PRESENTATIONS *

BY

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Compared with vertex presentations the incidence of breech presentations is low but the foetal mortality is high. Pierson (1923), Westman (1931), Dearnley (1931), Studdiford (1932), Geothals (1936), and Williams (1924) placed the incidence of breech deliveries between 2.3 and 3.7 per cent. Kedar Nath Das (1926) placed it at 3.3 per cent., and the latest report of the Wadia Hospital (1935) at Bombay gave it as 3.1 per cent. Ryder (1923), Pierson (1923), King and Gladden (1929), Gibberd (1931) Studdiford (1932), Morton (1932), Donovan (1933), Cannell and Dodek (1934), Gordon, Garlick, and Oginsz (1934), Barney (1934), Geothals (1936), and St. Mary's Hospital report for 1935 record the foetal mortality as varying from 8 to 26 per cent.; in complicated and premature breech presentations it was as high as 43 per cent. and 48.6 per cent.

Scope of Investigation

Desiring to find out the state of affairs at the Bhagat Hospital for Women and at my private hospital I have reviewed 5,028 deliveries—3,028 from my private hospital and 2,000 from the Bhagat Hospital.

In the first 1,240 deliveries at my hospital and 2,000 at the Bhagat Hospital all cases of breech presentation diagnosed during pregnancy were allowed to continue as such: these are reviewed as Group I. The next 1,788 consecutive cases at my hospital were treated by external version whenever a breech presentation was diagnosed during pregnancy; these represent Group II. All emergency breech cases and those undergoing breech delivery

* Abridged version of a paper read before the Bombay Obstetric and Gynaecological Society.

as a therapeutic measure for complications such as placenta praevia are excluded from both the groups, and only those who were under observation for some weeks before labour are considered.

Breech Presentations in 5,023 Deliveries.

	Group I	Group II	Group II	
			Untreated	External Version Performed
Total number of deliveries...	3,240	1,788	—	—
Breech cases diagnosed ante-natally		110	55	55
Primiparae		13	5	8
Multiparae		97	50	47
Breech deliveries	88 (2.7 %)	11 (0.6 %)	9	2
Primiparae	21	3	2	1
Multiparae	67	8	7	1
Cases delivered as vertex ...	—	99	46	53
External version performed	—	55	—	55
Mature babies born	53	94	43	51
Average weight	6 lb. 3 oz.	—	—	—
Stillbirths	6	1	1	—
Deaths	1	—	—	—
Foetal mortality	7 (13.2 %)	1 (1 %)	1	—
Premature babies born	35 (39.6 %)	16 (14.5 %)	12	4 (7.3 %)
Average weight	3 lb. 8½ oz.	—	—	—
Stillbirths	16	3	3	—
Deaths	10	1	1	—
Foetal mortality	26 (74.3 %)	4 (25 %)	4	—
Total foetal mortality	33 (37.5 %)	5 (4.5 %)	5 { 4 breech, 1 vertex	—
Stillborn	22	4	4	—
Died	11	1	1	—
Average weight of still-born and dead	4 lb. 10 oz.	3 lb. 14½ oz.	—	—
Foetal mortality in primiparae	7 (33.3 %)	2 (15.4 %)	2	—
Stillborn	5	2	2	—
Deaths	2	—	—	—
Foetal mortality in multiparae	26 (38.8 %)	3 (3 %)	3	—
Stillborn	17	2	2	—
Deaths	9	1	1	—
Average age of primiparae	19.6 years	18.1 years	—	—
Average external pelvic measurements in primiparae				
Interspinoous	21.4 cm.	20.1 cm.	—	—
Intercristal	23.4 cm.	22.4 cm.	—	—
External conjugate	17.0 cm.	17.6 cm.	—	—

The average weight of the children born in the two hospitals was 5 lb. 15½ oz.; the incidence of breech presentations in the whole series was 1.9 per cent.

Untreated Cases

In the first group of 3,240 deliveries in which breech presentations were not interfered with during pregnancy eighty-eight women were confined as breech deliveries, giving an incidence of 2.7 per cent., and the foetal mortality in these cases was 37.5 per cent.; twenty-two infants were stillborn and eleven died during the first ten days of the puerperium. The standard for deciding prematurity was not based on the gestation period counted from the first day of the last menstruation, because this was found to be very unreliable. A foetus weighing 5 lb. and over was taken as mature and one below 5 lb. as premature. This proved more satisfactory. The average weight of the children at the two hospitals under review has been 5 lb. 15½ oz.

On this standard we found fifty-three mature and thirty-five (39.6 per cent.) premature infants after breech de-

livery in Group I, with the average weight of 6 lb. 3 oz. and 3 lb. 8½ oz. respectively. Foetal mortality in the mature was 13.2 per cent. and in the premature 74.3 per cent. The average weight of the dead was 4 lb. 10 oz. Of the eighty-eight breech presentations in the group twenty-one were in primiparae, with a foetal mortality of 33.3 per cent. and sixty-seven in multiparae, with a foetal mortality of 38.8 per cent. Among the primiparae seventeen (81 per cent.) were mature and four (19 per cent.) were premature; three of the mature were stillborn, and two stillbirths and two deaths occurred in the premature children. The average weight of the dead in the mature was 6 lb. 8½ oz., while in the premature infants it was 3 lb. 8½ oz. The average age of the primiparae was 19.65 years. The average external pelvic measurements were: interspinoous 21.4 cm., intercrystal 23.4 cm., and external conjugate 17 cm.

Of the sixty-seven children born of multiparae thirty-six were mature and thirty-one (46.3 per cent.) premature, with an average weight of 6 lb. 2 oz. and 3 lb. 8 oz. respectively. The foetal mortality was 11 per cent. in the mature and 71 per cent. in the premature. The average weight in the dead was 3 lb. 7 oz. There were seventeen stillbirths, and nine infants died during the first ten days after birth; three stillbirths and one death occurred in the mature and fourteen stillbirths and eight deaths in the premature.

Foetal Mortality

The heavy foetal mortality in breech presentations has always worried obstetricians. In endeavouring to reduce it various factors have been blamed and a number of suggestions made. Gentleness, patience, episiotomy, sacral anaesthesia, preliminary ironing of the vagina, forceps for the after-coming head, and many other suggestions have been made by different writers. In spite of all this the lowest figure for the foetal mortality in breech presentations has remained higher than that in vertex presentations.

In Cleveland Maternity Hospital Barney (1934) found a foetal mortality of 18.9 per cent. in breech cases, excluding prematurity. Hirst and Williams have advised external version, as have Ryder (1923), King and Gladden (1929), Wilson (1930), Gibberd (1931), Studdiford (1932), Dearnley (1931), Donovan (1933), Cannell and Dodek (1934), Munro Kerr (1933), and Aleck Bourne (1933). In the last 1,788 consecutive deliveries at my hospital all cases of breech presentation diagnosed during the later months of pregnancy were carefully kept under observation. The practice at the hospital has been to register the patients for confinements about twelve weeks before term, and they are made to report frequently for observation. A breech presentation was diagnosed in 110 cases, but only eleven of them became breech deliveries—that is, 0.6 per cent. It was a coincidence that in exactly fifty-five cases the breech either turned to vertex naturally while under observation or confined as breech before it was decided to perform external version. The remaining fifty-five cases were treated by external version during pregnancy.

Results of External Version

The total number of breech deliveries in Group II was eleven: nine among the non-treated and only two in the treated cases. The foetal mortality in the series of 110 cases was five (4.54 per cent.) and all the deaths were in the non-treated cases. Of the five four were stillborn and one died during the first ten days. The average weight of the dead was 3 lb. 14½ oz. There was no mortality in the cases treated by external version. The foetal mor-

tality of 37.5 per cent. in Group I should be compared with that of 4.54 per cent. in Group II, with no mortality in the cases treated by external version.

Prematurity

The number of premature infants in this group was sixteen, of which twelve were in the non-treated group. This represents 14.5 per cent. as compared with 39.6 per cent. in Group I. What is the reason for such a fall in the number of premature labours? Is it due to the improvement of the general health of the patients as a result of ante-natal care, or is it that the breech presentation has a tendency to bring on premature labour? If the latter hypothesis can stand critical examination then the belief that prematurity is an aetiological factor in breech presentation will need to be reconsidered. It was frequently noticed that patients with the foetus lying in the breech position complained of vague pains in the abdomen and were more uncomfortable than those with the foetus lying normally in the vertex position. Is it possible that the breech position irritates the uterus in some way, and if this is the case is such irritation likely to initiate uterine contractions prematurely?

Among the non-treated cases of this group forty-six were confined as vertex presentations and nine as breech. Of the five deaths in the children there were three in the breech deliveries and two in the vertex. Of the fifty-five cases in which external version was performed forty-seven were multiparae and eight were primiparae. Version was successful in fifty-three and failed in two. There were fifty-one mature and only four premature infants. The number of premature births was thus one-fourth of those found in the non-treated cases and far below that of Group I. There was no foetal mortality among these treated cases. Of the two failed cases one was a primipara 17 years old, who came under observation only five days before delivery with the breech fixed in the pelvis; external version, though tried, could not be performed. The second case was a multipara diagnosed as a breech presentation on September 21; external version was tried on October 1. She did not report again, and came to the hospital in labour on October 16: a female child weighing 4½ lb. was delivered by the breech.

Many foetuses diagnosed as breech presentations during pregnancy turn to a vertex position before term; just as many do not turn naturally. This is seen from the comparison of the results of the two groups reviewed. The incidence in Group I was 2.7 per cent., while in Group II it was 0.6 per cent. Thus 2.1 per cent. failed to turn.

When to Perform Version

When should the external version be performed? The cases came under observation usually between the twenty-eighth and thirty-second weeks of pregnancy, the usual practice being to register them for confinement after the seventh month was completed. During the first four weeks of observation the patient was usually left alone. After that if the breech presentation persisted external version was performed. Only in a very small number of cases did the foetus revert to the breech position after version. A second attempt was made in these cases, and proved to be successful, except in the two cases described. Thus the time when external version was performed extended from the thirty-third week to very near term, usually between the thirty-third and thirty-sixth weeks.

I found that it was easy to perform version during those weeks, though later it became more and more difficult. In cases which reverted to the breech position it was not

difficult to perform version again. Anaesthesia was never found necessary in the series reported. It might be required and might be of help if the operation was postponed to the later weeks. Most authors are in favour of turning the child during the thirty-fourth or thirty-fifth weeks. Aleck Bourne (1933) and others advised it at the thirty-sixth week. Two weeks earlier than this has, to my mind, an advantage in the ease with which manipulations can be carried out, particularly in primiparae.

Possible Dangers

The early onset of labour and separation of the placenta and consequent ante-partum haemorrhage have been mentioned as possible dangers of version. Ryder (1923) had one case of bleeding per vaginam and premature labour, but with no untoward consequence. Wrigley (1934), criticizing ante-natal work, observed that in two London obstetric hospitals where external version was performed under anaesthesia the manipulations had caused rupture of membranes in some cases, and in one the cord prolapsed, while in three there was brisk ante-partum haemorrhage. Foetal deaths were caused by asphyxia owing to detachment of the placenta and constriction of the umbilical cord as a direct result of a somewhat violent effort to turn the baby. He observed that external cephalic version under anaesthesia must be regarded as a manipulation that was not free from danger and must not be performed with any force. McCullagh (1933), besides the complications already mentioned, suggested a possible danger of rupture of the uterus at the time of labour subsequent to the version, particularly in breech with extended legs. He collected four cases of this kind from the literature, and therefore advised x-ray examinations before and after version, concluding that if the child presented by head and feet it should be turned again and delivered by the breech.

Aleck Bourne (1933) maintained that the risks of version were counterbalanced by greater safety to the woman and far greater safety to the child. Munro Kerr (1933) advised that all breech presentations should be corrected to vertex. Studdiford (1932) believed that the operation of version was harmless, but quoted Ehrenfest's statement that anaesthesia was dangerous. Ryder (1923) was enthusiastic about the good results of external version. He pointed out that by doing an external version one was able to judge the size of the pelvis; anaesthesia was risky, as undue force might be applied.

In our cases no anaesthesia was used; in one patient in whom anaesthesia might have been of use the presentation was allowed to continue as a breech. If version is performed early and not delayed till after the thirty-sixth week anaesthesia should not be necessary. The foetus, being above the pelvis, turns easily without any undue force. Even cases with extended legs would not present difficulties if version was practised in the earlier weeks, though cases with extended legs noticed during the last weeks would not be easy to turn; x rays would be of help in such instances.

TECHNIQUE

The patient was advised to take a light opening medicine overnight, and she was called next morning at about 9 o'clock; after she had passed urine she was put on the operation table. The head of the table was lowered a little, but a pillow was kept under her head. She was asked to flex her thighs about 30 degrees by drawing the legs up; this procedure gave good relaxation of the abdominal muscles. The abdomen was well powdered and the position of the foetus ascertained after assuring the patient that the manipulations would not give

her pain. She was asked to go on taking gradual deep breaths followed by complete expiration. This allowed the operator's fingers good access down into the pelvic cavity. The breech was taken out of the pelvis and into the superior strait. Once this was accomplished the rest was not difficult. The breech was pushed out and up towards the back of the foetus and the head in and down towards the child's abdomen. A few movements like this were necessary to get the head into the iliac fossa. Then the patient was asked to turn a little to the side opposite to that in which the back of the foetus was lying. When this was done the head was pushed inwards and downwards and the breech lifted upwards. The head was felt passing over the brim into the pelvic inlet. The dorsal position was then resumed and the head was gripped between the fingers and pushed down into the pelvic cavity. This last manœuvre gave us an idea of the size of the pelvis. Once the head was in the pelvis the version was complete. Occasionally it was necessary to push the breech towards the child's abdomen and the head towards its back, the child turning by anti-clockwise movement. Pushing out the breech from the pelvic cavity by the help of fingers introduced in the vagina was also occasionally required. No binder or any other appliance was found necessary to maintain the vertex position.

The patient was asked to report two days later, and was kept under observation subsequently. If at any later visit reversal to a breech position was noticed another attempt at cephalic version was made. More than two attempts were never found necessary, and that, too, in a very small number of cases. We did not meet with any untoward complications due to the manipulations.

I cannot conclude without expressing my thanks to my house-surgeons Drs. Jhavery and Shah.

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A special tour in Central Europe has been arranged for May 23 to June 10 in connexion with the meeting at Bucarest of the Permanent Committee of the International Congress of Military Medicine and Pharmacy. Leaving Paris on May 23 at 10.15 p.m. the places to be visited include Venice, Dubrovnik, Cettigne, Serajevo, Belgrade, Turnu-Severin, and seven days in Bucarest. The fee of £61 10s. covers all travel expenses from Paris to Bucarest and back with second-class rail travel with Wagons-lits and first-class passages on river boats and various excursions on the way. An alternative return journey through Budapest and Vienna, extending over June 10 to 16, can be made for £7. For further details and for booking application should be made to Gellatly, Hankey and Co., Ltd., 62, Pall Mall, London, S.W.1, or at the offices of this firm in Manchester, Liverpool, or Glasgow.

A NEW STABILIZER FOR SCHICK TOXIN

BY

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AND

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The improvement in methods of making dilutions of diphtheria toxin used in the Schick test has steadily increased their stability during the past sixteen years, and now such dilutions remain unaltered for at least six to twelve months, or more, at room temperature. We have retested many batches that have been returned to us from such distant places as Bombay, Shanghai, Capetown, the Federated Malay States, and the Argentine. These dilutions have travelled by ordinary post or by air mail, and have always been of full strength when tested on their return. Recent papers, however, have shown that the present dilutions produce allergic reactions in a very small percentage of subjects. H. J. Parish (1936) summarizes fourteen such cases, including one with very severe reactions attributed to peptone, reported by G. Bousfield (1936). The possibility of producing with Schick toxin a severe allergic response to peptone has induced us to find another stabilizing agent free from this disadvantage. We propose for the purpose human serum.

Experimental Work

The strength of Schick toxin dilutions has been measured quantitatively at the Wellcome Physiological Research Laboratories by the determination of the minimal reacting dose in guinea-pigs and by titration against antitoxin (Glenny and O'Brien, 1921). Stability has been judged by tests made after exposure to higher temperatures than would be encountered during normal storage. As improvements have been made so we have increased the temperature by different stages from 30° C. to 45° C. Results of this rapid test for deterioration have always been confirmed by subsequent tests on material left for long periods at room temperature. In his pioneer work in this country on diphtheria immunization Dr. R. A. O'Brien used for the Schick test dilutions in saline containing 0.5 per cent. phenol, the common U.S.A. diluent. Such dilutions remained stable for a week at 15° C. but retained only 5 to 15 per cent. their original strength after twenty-four hours at 35° C. A few seconds' shaking in partially filled bottles caused total destruction (Glenny *et al.*, 1925). Experimental work showed that a buffer solution increased the stability of toxin dilutions, and although a phosphate buffer was more suitable to use at the optimum pH for stability, a boric borate buffer (Glenny *et al.*, 1928) of slightly higher pH was chosen for its bacteriostatic properties. Some batches of toxin diluted to Schick strength in buffer were more stable than others, remaining at full strength for fourteen weeks at room temperature, whereas others were only stable for four weeks. Weaker toxins needing less dilution were more stable than stronger toxins. Assuming that increased stability was due to a higher broth content, the next step was to increase the amount of broth in the dilution to 0.5 per cent. Such dilutions remained stable for six months at room temperature. Bunney (1931) suggested the use of 2 per cent. peptone. Experiments at these laboratories showed that 0.1 per cent. Witte peptone in borate buffer solution was sufficient to stabilize Schick toxin so that it would remain of full potency for twelve months or more at room temperature.