minutes. Dizziness was slight or absent with physeptone or pethidine. With all three drugs there was a pleasant feeling of detachment, and with pethidine euphoria was marked in the majority of cases even though no relief of pain was noted. C.B.11 produced pupillary contraction in all 10 cases.

Clinical Study.—Eighteen patients suffering from pain of different types and of different degrees of severity were given C.B.11 in doses varying between 10 and 30 mg. The oral, intramuscular, and intravenous routes were all employed at different times. The results are summarized in Table II.

TABLE II

	No. of Cases	Complete Relief	Some Relief	No Relief
Coronary thrombosis	4	4	—	—
Teeth extraction	1	1	—	—
Pulmonary infarct	1	1	—	—
Pleurisy	2	2	—	—
Angina decubitus	2	—	1	1
Biliary colic	1	—	1	—
Gangrene	1	—	—	1
Sciatica	3	1	2	—
Neoplasm—secondary deposits	2	2	—	—
Miscarriage	1	1	—	—
	18	12	4	2

Given by mouth, 20 mg. of the drug produced analgesia in 20 to 30 minutes when the pain was not severe, the effect lasting for three to four hours. When the pain was more severe, as in cases of coronary thrombosis, a dose of 30–50 mg. was required to relieve the pain. No hypnotic effects were evident when the drug was given orally.

The intramuscular injection of C.B.11 produced relief of pain in 10 to 15 minutes—an effect which lasted two to three hours. Very little cortical depressant action was evident. The dosage used was 10–20 mg. Giddiness and vomiting were noted only in ambulant patients and not in those confined to bed.

Given intravenously in doses of 10–20 mg., analgesia was produced within two minutes and was accompanied by a feeling of dizziness, which passed off in a short time. The analgesic effect lasted for one to two hours.

Conclusion

This preliminary study suggests that C.B.11 is a potent analgesic, comparing favourably with physeptone, and is apparently more active than pethidine under the conditions of the experiment. In a short clinical trial it proved to be effective in the relief of some types of pain.

There is no evidence at present that C.B.11 is a drug of addiction.

We consider it is worthy of more extensive trial.

This study was suggested by Professor D. M. Dunlop, to whom we are grateful for advice and criticism. We are also grateful to Dr. H. M. Walker, of Glaxo Laboratories, for reports of the animal experiments and for supplies of C.B.11.

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ASPHYXIA OF THE NEWBORN TREATED BY ROCKING

BY

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AND

The Late N. C. FORSYTH, M.D.

The unexpected death of Dr. Forsyth in November, 1947, lays on me the duty of publishing his work, which he was about to do. At Malton (Yorks) he had a large practice in midwifery of about 90 cases a year. Since 1932, when I published my rocking method of artificial respiration, he applied it to all his cases of "white asphyxia"—11 cases without a death. Hence his experience is unique and notable.

In 1947 I reported the case of a drowned boy of 14 treated (manually) by rocking (Eve, 1947). He was beyond recovery, but the colour change in his cheeks from blue to pink showed that an oxygenated artificial circulation had been created and maintained. I was excited to hear from Dr. Forsyth that the same colour change had occurred in all his 11 cases *before* the first gasp. I interpreted this to mean that rocking had restored a circulation to the respiratory nerve cells, which *then* were revived enough to make the respiratory muscles gasp. The lungs, unexpanded at first, may supply only a modicum of oxygen, but apparently that is enough for the modest demands of the nerve cells provided their blood is renewed by a *circulation*; stagnation is quickly fatal, and is aggravated by accumulated CO₂. Those with "white asphyxia" suffer from the enfeebled circulation of shock. Hitherto our conscious goal has been pulmonary ventilation. The first lesson learnt from these 11 cases is that we must concentrate on providing an oxygenated circulation (indicated by a pink face) to the nerve cells. If these are still viable they will then produce respiration in the natural manner. *Restore the circulation and the respiration restores itself.* The infant's heart can survive much longer, and rocking forces blood through the heart muscle.

Schmidt *et al.* (1945) were experimenting on the "gaseous metabolism of monkeys' brains." Finally the animals were killed by letting them bleed through the catheters which had been tied in the jugular veins. When heart and respiration had ceased they found (by chance) that by sucking out more blood from the jugular veins by a syringe "respiratory activity could be restarted and maintained for some time. This was confirmed by subsequent similar experiments, provided the monkey was in good condition." Hence they suggest that prompt manual artificial respiration may revive electric-shock patients by creating movement of blood in the cerebral vessels.

This recent evidence strengthens my plea that in asphyxiated babies natural respiration may be started by rocking if the cerebral blood (stagnant in quiescence) can be moved onwards. The valves in the heart ensure that the movement will be towards the heart. It is rarely remembered that every millilitre of venous blood which can be coaxed from the rigid cranial cavity is inevitably (I think) replaced by a millilitre of arterial blood from the lungs.

The second new and important lesson learnt from these 11 successful cases is that rocking is certainly not harmful in shock, and appears to be beneficial. The treatment at present orthodox in these asphyxia cases is concentrated on shock, and consists mainly of quiescence and hope. If rocking is harmless in shock it seems to me far preferable to this stagnation treatment.

The delegates to the first World Health Assembly will have "five weeks of very hard work," according to Dr. Brock Chisholm, Executive Secretary of the Interim Commission, who points out that "for the newly formed W.H.O., the member nations, and the secretariat there will be a year of hard work in 1949 to implement the decisions of the Assembly. As for the peoples of the world there is just beginning a realization of the W.H.O. constitution, which stands 'for the enjoyment of the highest available standard of health for every human being without distinction of race, religion, political belief, economical or social condition.'"

Many of the dogs used in the rocking experiments of Hemingway and Neil (1944) had their upper spinal cord cut and had the low blood pressure of "spinal shock." Yet rocking maintained their circulation and was more effective than Schäfer's method or respiration by pump as regards oxygen consumption in the body. Schäfer's compression method could not be expected to expand the solid lungs of the newborn infant: they need expansion before they can be compressed.

Eight of Dr. Forsyth's cases were due to strangulation of the cord round the neck (nerve cells starved and anoxic); five were instrumental deliveries. He did not rock the few cases of cerebral haemorrhage which were born dead or died after a few gasps. Two recent cases were: (1) A breech case, born in white asphyxia with a faintly beating heart. The face turned pink after four or five double rocks, but the first respirations occurred only after rocking for eight minutes. (2) In a boy delivered by caesarean section the heart was impalpable. The first breath occurred after rocking for seven minutes, but the change in colour from white to pink was noted some minutes *before* the first gasp. This illuminating precedence (circulation *before* respiration) was observed by Dr. Forsyth in all his 11 cases. Has anyone observed it without rocking? I cannot get an answer. No one need be deterred from rocking by fear that it may increase a cerebral haemorrhage: the harm has already been done and the infant will soon be dead or better dead.

Dr. Forsyth's method in his first case was to rock the baby in his large hands before the fire (success after 35 minutes). Later he found it better to stand holding the baby, wrapped in a towel and lying on its side, to his chest. Thus he could hear the respirations, and the nurse could suck mucus from the throat with a No. 10 rubber catheter. He could rock the baby—as women do—by swaying his body through some 40 to 70 degrees each way without fatigue. I have verified these angles and find them easily attained if the knees are bent a little alternately. Gravity would have longer columns of blood to act on if the infant's legs were extended and the arms raised straight overhead. Ten double rocks a minute are enough. Presumably steep angles are best.

For clarity, I have so far deferred the CO₂ factor. In an important paper by Comroe and Dripps (1946) two adults with severe cerebral injury were investigated carefully. They survived about five hours without breathing or consciousness. Shock had reduced their blood pressure to 40–70 mm. Hg. Hence their condition resembled cases of newborn asphyxia: the colour was not recorded. They were kept alive by infusions and intratracheal oxygen for two to three hours, which oxygenated their blood (fully at first) and gave them a pink colour. Yet their arterial blood was found by analysis to be poisoned by CO₂ (tension 314 mm. Hg, equivalent to 44% alveolar CO₂), which did not betray itself to the clinician. This great excess of CO₂ would narcotize the nerve cells, depressing respiration and blood pressure. It could be washed out only by expansion and contraction of the lungs. Schäfer's method was tried, but it yielded only the "completely inadequate" tidal air of 72 to 117 c.cm., owing to lack of tonus in elastic recoil. Thus "the method fails when it is most needed—in deep asphyxia which abolishes tonus. On the other hand, Eve's rocking method gave the adequate tidal air of 286 to 500 c.cm., as it is independent of tonus. Circulatory benefits could not be measured."

From this paper we learn that our cases of newborn asphyxia are presumably being poisoned by excess of CO₂ until the lungs work. (This could be verified by blood analysis promptly after death in cerebral haemorrhage cases.) Also we do not know whether rocking expands the

lungs effectively. (This could be ascertained by x-ray examination or at necropsy in cases of failure.) Meanwhile it seems reasonable to spend a few seconds in gentle mouth-to-mouth inflation of the lungs. *Then* we could confidently expect rocking to oxygenate the lungs and blood, sweep out excess of CO₂, and provide a circulation for the brain and heart muscle. Oxygen can be added, often with advantage. But to add 7% CO₂ to a probable 44% excess is deplorable poisoning.

I believe a co-ordinated research on some such lines would save many future citizens and much maternal anguish. I have tried in vain to compare Dr. Forsyth's results with those obtained in hospitals by other methods. There seems a deplorable lack of co-ordinate study in these awkward emergency cases. In the U.S.A., where 30,000 babies die annually of asphyxia, Dr. P. F. Flagg, chairman of the Asphyxia Committee of the American Medical Association, makes the same lament.

Some of my conclusions must be tentative until Dr. Forsyth's evidence is properly confirmed—notably, that if rocking restores the circulation the respiration restores itself.

My thanks for help are due to Professor A. Hemingway, Professor Alan Moncrieff, and Dr. Doreen Daley.

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GYNATRESIA: REPORT OF THREE UNCOMMON CLINICAL TYPES

BY

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Anomalies due to aplasia of the female genital tract are not infrequent and, depending on the extent and location of the aplasia, all varieties and degrees of gynatresia may result. The more complex congenital abnormalities are usually associated with a non-functioning uterus and are rarely of much practical importance. I have recently had under my care three unusual types of gynatresia, with certain features in common. Failure of canalization was limited in extent and localized to the cervical or vaginal segments of the Müllerian tract, and the symptomatology was dependent upon the presence of a functioning uterus. Two were examples of haematometra due to atresia at the level of the cervix, and the third was a case of hydro-colpos, a condition in which an accumulation of watery or mucoid fluid in the vagina may produce serious mechanical effects during infancy and childhood.

Congenital Atresia of the Cervix with Haematometra

Case Report.—A married woman, aged 31, attended the Cardiff Royal Infirmary in September, 1945, complaining of right-sided abdominal pain. The pain had come on in attacks at irregular intervals for the previous twelve months, and these were increasing in severity. She had never menstruated. On speculum examination the portio and external os had a normal appearance, but the cervical canal was represented by a shallow blind depression, and the uterus was enlarged to the size of a three-months pregnancy. At laparotomy the uterus was found uniformly enlarged, and there was some distension of the