slowly; it takes about forty-eight hours to reach its maximum concentration.

It is recommended that 10,000 units at least be injected intrathecally at the earliest possible moment under anesthesia, and 10,000 units intramuscularly at the same time, in any patient who presents any definite symptoms. I regard anesthesia as essential in these cases. If there is no improvement in eighteen hours these doses should be repeated, and it is sometimes necessary to do this daily on three or four successive days. The volume of serum injected intrathecally should, of course, be rather less than the amount of cerebrospinal fluid drawn off and run in by gravity. In cases which respond to this treatment it is still wise to inject 10,000 units daily until the danger of relapse is passed, as shown by the absence of spasms and complete muscular relaxation. Intravenous administration is not recommended, as therapeutically it is inferior to the intrathecal method.

Treatment of wound, if present, is important and requires judgment, and I strongly recommend before any manipulative treatment is undertaken that an injection of 10,000 units should be given intramuscularly.

Local Treatment.—Amputation well above the site of infection, excision of the wound, or local irrigation with oxygenizing antiseptics, and, of course, efficient drainage, are methods which may be used, according to circumstances. Carrel's method is often very useful, using hydrogen peroxid, hypertonic saline, or Dakin's solution, etc. Of these I prefer hypertonic saline with sodium citrate. Symptomatic treatment consists in keeping the patient quiet in a darkened room and removing all sources of irritation or stimulation liable to provoke reflex spasms. Chloretone in twenty-five grain doses in olive oil per rectum was useful in reducing nervous excitability.

No cases of local tetanus came to the Holberton Hospital while I was there. It is simply tetanus occurring in a person insufficiently protected or immunized, and characterized by local spasm and rigidity of the muscles adjacent to the wound. It is very rare except in after-war injuries, where the antitoxin injected at the time of injury was insufficient to give full immunity. It may show itself weeks or months after the initial injury, usually after further operative interference. The affected muscles show rigidity and spasticity and differ only in degree from the major tetanus, except in one respect, and that is, the stiffness tends to persist sometimes for months. It is practically never fatal if properly treated. Tetanus does not appear to be very common in the United States of America. For the one hundred thousand admissions into the Los Angeles General Hospital between 1916 and 1923 there were seventy-two cases of tetanus, or one in fourteen hundred admissions.

Even with this proportion, taking the country as a whole, it is not a condition which we can afford to neglect.

Medico-Dental Building.

RESUSCITATION OF THE NEWBORN: COMMENTS ON METHODS*

By Ethel Righetti, M. D.
San Francisco

Discussion *by Dorothy A. Wood, M. D., San Francisco; Karl L. Schaupp, M. D., San Francisco.*

THE anesthetist as a member of an obstetrical unit, administering anesthetic agents to the mother, is increasingly called upon to aid in the resuscitation of the newborn, because of his familiarity with the apparatus and the gases used according to the newer conception of respiration.

Asphyxia neonatorum is the term applied to indicate an absence of breathing in the newborn. The circulation continues at birth, but there is an absence or failure of respiration, causing death. Respiration is initiated and regulated by the action of the blood gases, especially CO_2 on the respiratory center. Asphyxia results from interference with this gaseous exchange either before or after birth, through such causes as premature separation of the placenta, compression of the cord, delayed labor, the use of various drugs such as morphin, atelectasis of the lungs and intracranial injuries and pressure affecting the circulation of the respiratory center. Since varying degrees of intracranial congestion and the tendency to hemorrhage results from asphyxia, the method used in treating these infants often determines the outcome.

MANUAL METHODS HARMFUL

The manual methods, positively harmful, are still widely used. Swinging the child by the feet or arms increases cerebral congestion and may cause hemorrhage. Vigorous rubbing of the skin or spanking often cause hemorrhage and injury to the internal organs, as does also the flexion and extension method of resuscitation. The immersion of the child alternately in ice water and in warm water dissipates heat and produces or adds to shock.

Mild cases of asphyxia respond often to the Sylvester method of artificial respiration, and to the "mouth to mouth" inflation of the infant's lungs, provided only gentle pressure is used. Vigorous inflation causes emphysema. Drugs are valueless in asphyxia as respiratory stimulants. Adrenalin into the heart muscle may help to bolster a failing circulation pending the effective use of carbon dioxid and oxygen.

Commonly in the newborn, and particularly in the premature infant, more or less extensive areas of atelectasis are present in the lungs. The circulation is deficient in both carbon dioxid and oxygen and the respiratory center remains inactive or respiration is feeble and irregular.

CARBON DIOXID PROCEDURE

The physiological stimulant of the respiratory center is carbon dioxid. Given with oxygen which is essential to the vitality of the center and to the body metabolism, in mixtures of 5 per cent carbon dioxid and 95 per cent oxygen, we

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have the logical treatment of asphyxia of the newborn. With the infant warmly wrapped and the respiratory passages free from fluid or meconium through gentle suction, these inhalations at a pressure no greater than six millimeters of mercury usually initiate respiration. They should be continued for several hours after respiration is established. Occasionally with more marked depression higher percentages of carbon dioxid must be used at the beginning. In infants with atelectasis the carbon dioxid therapy must be continued for several days or pneumonia will supervene.

This treatment usually suffices except in patients with severe intracranial damage. Where there are extensive hemorrhages or tears into the meninges, or brain injuries, treatment is most often ineffective. Lumbar puncture may relieve pressure due to hemorrhage. Artificial respiration by means of the Drinker respirator, along with the inhalation of carbon dioxid, has been successful in a small number of patients. If adequate ventilation of the lungs is secured and life maintained over a long enough period, it seems reasonable to conclude that the depression of the respiratory center may be overcome and a normal activity be established.

Anesthetists will be interested in applying the physiological therapy not only to resuscitate the asphyxiated infant, but to all newborns as a prophylactic measure to reduce the present high neonatal deaths from asphyxia and pneumonia.

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DISCUSSION

DOROTHY A. WOOD, M. D. (1390 Seventh Avenue, San Francisco).—Resuscitation of the newborn, as Doctor Righetti brings out, is most successfully accomplished by the use of carbon dioxid and oxygen, usually in mixtures of 5-10 of CO_2 and 95-90 of O. The method of administration may vary, depending on whether the child has breathed spontaneously or not. If the child has breathed but its respirations are feeble in excursion, the low pressure cylinder with gas flowing through a wash bottle and connected by rubber tubing to a funnel, which can be placed beside the baby's face, is used. This can be continued for several hours or several days, as indicated. But if the child has made no attempt to breathe, then it is necessary to use a resuscitator which is automatically arranged to produce artificial respiration and so establish spontaneous breathing in the child. When the latter method is used, it is necessary that the respiratory passages be first freed from fluid and meconium that none of this material is forced down into the baby's lungs.

KARL L. SCHAUPP, M. D. (490 Post Street, San Francisco).—Doctor Righetti says that manual methods are positively harmful. This statement should be modified, for if properly performed, artificial respiration by "folding maneuvre," gentle spanking of the buttocks and stimulation of the skin are of great value. One must remember, however, that the tissue of a newborn child cannot stand a great deal of trauma.

The immersion of a newborn in cold tubs has no value in resuscitation, in fact it probably is the cause of failure more often than not. Hot tubs, on the other hand, are invaluable. Their use insures maintenance of normal temperature and is an excellent stimulating agent as well.

The use of five per cent carbon dioxid and 95 per cent oxygen is, to my mind, the best method at hand at the present time. However, to be effective the mixture must reach the lungs, which means artificial respiration or positive pressure. Both of these, by mechanical means, carry with them greater danger than when gentle manipulations are made by experienced hands. This is especially true in instances where there is a little excitement and haste is being made. Valves are opened too widely or proper adjustment of mechanism is not made, and the damage which results is irreparable.

ERYTHEMA INFECTIOSUM*

By HARRY C. COE, M. D.
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AND
By FRANK L. KELLY, M. D.
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IN October, 1930, a small epidemic of erythema infectiosum occurred in Berkeley. Cases were also seen during the months of November and December. This epidemic aroused my interest, and on reviewing the literature I was surprised to find that erythema infectiosum had never been reported from California. In fact, very few epidemics have been described in America.

COMMENT ON THE BERKELEY EPIDEMIC

It is the purpose of this paper to briefly report the Berkeley epidemic and to review the findings in this exanthem in order that others may recognize the disease should it appear elsewhere in California.

Erythema infectiosum is one of the common exanthemata of childhood in Germany and Austria. It was first described in 1886 by Tschamer, who, however, believed it was an abortive type of German measles. Ten years later Escherich proved that it was a separate and distinct disease and in 1899 it was given the name erythema infectiosum by Stricker. In 1904, while working in Escherich's Clinic in Vienna, Shaw studied an epidemic of erythema infectiosum, and on his return to America in 1905 he wrote a very excellent and complete description of the disease in the *American Journal of Medical Sciences*.[1] His was the first report on this subject in the American medical literature. In 1926 Herrick reported the first epidemic of erythema infectiosum in America. His paper appeared in the *American Journal of Diseases of Children*.[2] Since then other epidemics have been reported from St. Louis, Hamburg, New York, and Ogden, Utah.[3] Although the disease was recognized thirty-five years ago in Europe and described in the American journals twenty-five years ago, it was not until four years ago that an epidemic was reported in this country. Erythema infectiosum is either uncommon in America, or it is being incorrectly diagnosed as something else.

Erythema infectiosum is a mild contagious disease of childhood, without subjective symptoms, and characterized by a maculopapular, rose-red rash, which is more pronounced on the face, legs, and arms. The etiology is unknown. Children between the ages of four and twelve are more often affected. Immunity is produced by an attack, but those immune to erythema infectiosum

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