OBSTETRICS

FOR

NURSES

BY

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Fully Illustrated

PHILADELPHIA, NEW YORK, LONDON

W. B. SAUNDERS AND COMPANY

1904

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CHAPTER VI.

THE CARE OF PREMATURE INFANTS.

THE care of premature infants requires the highest kind of nursing skill and the greatest self-sacrifice and devotion. The results, however, are gratifying in the extreme, as nearly every child that can respire and digest food can be saved. These children grow up and are strong, so that there is no argument for refusing them the necessary care.

There is a popular notion that children of the eighth month of pregnancy have less chance of survival than those of seven months. This notion, like many others, is a popular fallacy, although it is very old, dating from the time of Hippocrates, who said that the weakness of the eight months' child was due to its being tired with efforts to leave the uterus, whereas if it waited until the ninth month, it was sufficiently strong.

The longer the infant remains in the womb, the stronger it becomes, although if the pregnancy goes too far over time, the child may die. We regard as premature all children born before three weeks of the normal end of pregnancy. Depending on the degree of prematurity, the children present the following characteristics: They are small, weighing from 2 to 5 pounds; the skin is red, thin, and the blood-vessels show through; the body is partly covered with a fuzzy growth of fine hair called lanugo; the nose has little white comedones; the ears are

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soft and pliable; the child looks old, especially after a week, when the loss of weight has occurred, and the little body is shriveled; the cry is weak and whining, but most of the time the infant lies in a peculiar stupor; the temperature has a tendency to be subnormal and very irregular; the bowels are sluggish; the urine is scanty; later jaundice is usually marked.

The initial loss of weight is relatively greater in premature infants, and the return to the birth-weight is much slower, requiring some twenty to thirty days (see Fig. 133). Since the appetite is often in abeyance, these little mites would starve to death unless fed forcedly. The lungs of premature infants are slow to unfold, remaining in a condition called atelectasis pulmonum. This is usually fatal, unless properly relieved.

Latterly our knowledge of premature infants has increased, and we are more successful in rearing them. To be successful requires three things: first, mother's milk; second, good nursing; and third, a good incubator. That heat is absolutely necessary for premature infants was known since ancient times. In the middle ages premature infants were wrapped in the skin of a sheep with the wool on, or put in a jar of feathers. Later they were enveloped in cotton. Sterne, in the middle of the eighteenth century, relates how the child of a physician was raised by the "same artifice that one used to make chickens hatch in Egypt. He put his son in an oven, properly constructed, heated regularly, the temperature of which was regulated by suitable instruments." Nothing came of this suggestion.

In 1857 Denucè described a double-walled bath-tub, with water in the interspace, for the rearing of feeble infants. In 1866 Credè, of Leipsic, used an identical con-

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trivance, although he did not publish it until 1884. In 1880 Tarnier had Odile Martin, a poultry raiser of the Jardin des Plantes, Paris, construct an infant incubator on the plan of a chicken incubator. It was installed in the Maternitè, and could hold several children. Winckel

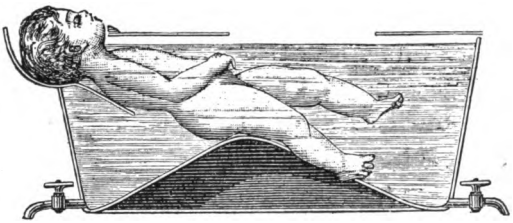


FIG. 134.—Winckel's permanent bath for premature infants.

has constructed a permanent bath in which the child floats, this to avoid the rapid evaporation and to imitate

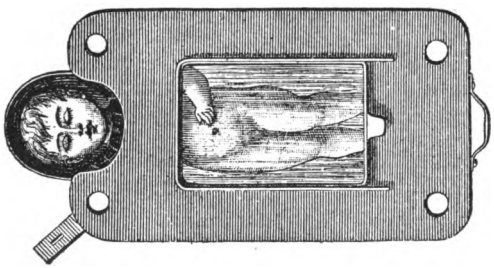


FIG. 135.—Winckel's permanent bath for premature infants.

more closely the liquor amnii (Figs. 134, 135). The bath ought to be placed in an incubator.

THE INCUBATOR OR COUVEUSE.

There are several, made of wood and of metal, on the market. Some open at the top, others at the front.

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Some, as the Auvard, are heated by hot-water bottles, some by hot air, some, as the Truax, by steam (Fig. 136). Most are heated by hot water, which is by far the best method, because the temperature is kept evenly. Most incubators have no automatic heat regulation, and with such the nurse must carefully watch the thermometer which is placed inside, and provide more or less heat as needed. Both overheating and chilling are to be avoided. A few instruments have automatic heat regulation, but even here the nurse must occasionally consult

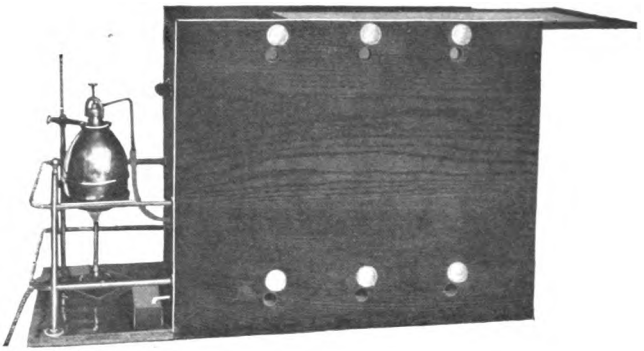


FIG. 136.—The Truax incubator.

the thermometer to assure herself that the thermostat (or heat regulator) is working properly.

In all incubators heated by steam or hot water the nurse must see that the supply of water does not run low. This endangers the infant and also the apparatus.

The ventilation of the incubator is highly important. The writer has never seen a closed incubator ventilate properly unless it was connected with the air outside the building. All incubators of the box type require the lid to be left slightly open, to insure the infant an adequate

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fresh-air supply. This is especially necessary in summer. The air seems to stagnate. The incubator should be raised at least two feet from the floor, and should be free from exposure to drafts, dust, and chilling. It must be lighted, because for the first week the infant requires close watching.

If an incubator of modern type cannot be obtained, one can improvise a warm nest for the infant by means of a large clothes-basket well lined with blankets, a soft pillow, and six or eight hot-water bottles. These are changed frequently. With constant attention such a makeshift will do fairly good work.

Every city should be provided with an "incubator station." This is a plant connected preferably with a lying-in hospital, consisting of several incubators and the necessary specially trained nurses, wet-nurses, and mechanical appurtenances. To these stations children could be brought, even from great distances, for that particular care which special training and practice only are able to bestow. The station of the Chicago Lying-In Hospital is a model of this class, and deserves a short description here:

As shown in the illustrations (Figs. 137, 138), the incubators are of steel and glass. They are heated by a hot-water pan placed five inches below the infant's bed. The boiler for heating the water in the pan may be seen at the right side. The system is identical with that used in the hot-water heating of houses. The heat regulator is above the boiler, and, once set at the desired temperature, requires no attention. The child is handled through the two doors in front, and is fed through the sliding window on the left. On the left also is a box containing a glass of water. This is for moistening the

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air. The air, fresh from the sunny outside, is led by a three-inch flue directly into the box, passing through a cotton filter. The opening from the box into the heating

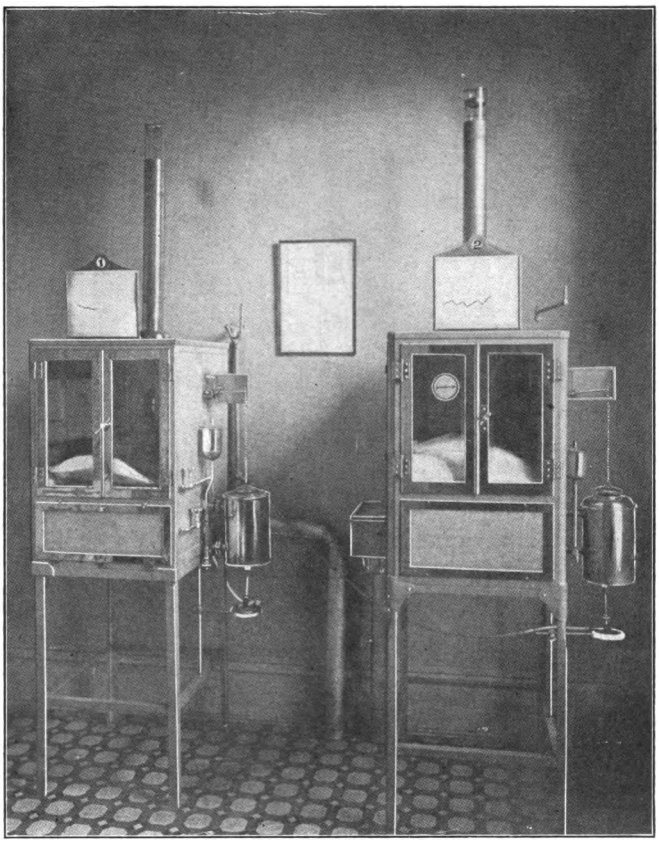


FIG. 137.—Two of the incubators of the system at the Chicago Lying-In Hospital.

chamber of the incubator is closed by a sliding damper, by which the amount of air admitted to the apparatus is regulated. The air is heated by passing around a large

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pan of water (connected by pipes with the water boiler on the outside), and, after circulating around the infant,

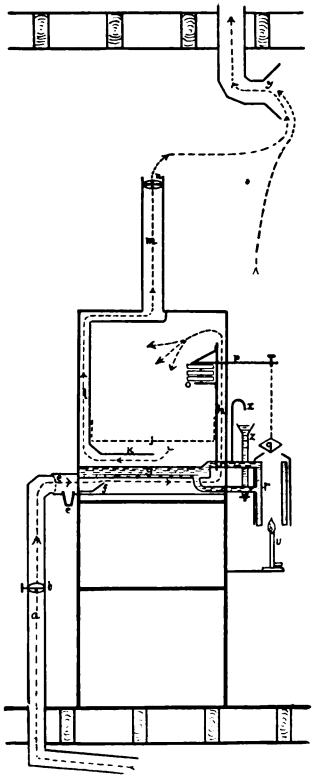


FIG. 138.—Diagrammatic section of incubator system in Chicago Lying-In Hospital: *a*, Pipe bringing air from outside; *b*, damper; *c*, cotton filter; *e*, glass of water in moisture-box; *f*, screen to distribute air evenly under warming-pan; *g*, water-pan; *h*, flue conducting air into bed-chamber; *j*, bed; *k*, draft plate to lead air out of bed-chamber into flue *l*; *l*, escape flue; *m*, chimney; *n*, anemoscope; *o*, ethyl chlorid discs; *p*, lever; *q*, cover of air-flue over heater; *r*, hot-water boiler; *v*, gas-burner; *x*, air vent to hot-water system; *y*, exit flue through ceiling; *z*, filling cup, for the hot-water heating system.

is automatically removed through a flue on the top of the box. A little wheel in this flue indicates the current of

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air. The child lies in a basket suspended over the hot-water pan; the mattress on which it lies is of eiderdown.

A delicate thermometer is fastened near the side window, so that it is easily read, and a hygrometer, to indicate the degree of moisture, hangs in the back.



FIG. 139.—Incubator ambulance open, showing electric light, thermometer, infant's basket with eiderdown flannel mattress and coverlet.

The room in which the incubators are installed has also a natural ventilation through the ceiling to a space under the eaves, which is likewise ventilated. The schematic drawing will show the tortuous current of air; the nurse may follow the dotted line in its windings from below the floor through the apparatus and out through the ceiling.

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This is an ideal arrangement, as it provides a certainty of fresh, filtered, moistened air, and even in stormy weather precludes a draft through the incubator.

Many children have to be brought from distances, sometimes of seventy-five miles, and for such transportation an ambulance incubator is provided (Figs. 139, 140). This is a perfect incubator in miniature, with a circulating hot-water system heated from the outside by an alcohol lamp, well ventilated, and lighted by electricity.



FIG. 140.—Incubator ambulance closed; ready for transportation of infant. During transit the child is closely observed through a window in the top.

It is 21 inches long, 11 inches wide, and 11 inches high, and can be easily carried by one person.

Care of the Incubator.—The temperature should, as a general rule, be kept at about 89° F. It may fluctuate from 86° to 91° F. without being dangerous. If the infant is strong or less premature, or if it sweats too much at this temperature, the regulator should be set at 86° or even 84° F. If the child is very premature or if its temperature persists in remaining low, the incubator must be warmer, being set at 91° or even 93° F. This,

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however, is seldom necessary for any length of time—two or three days at most, when a temperature of 89° F. is more desirable. With a little practice, the nurse gets to know what degree of heat is best suited to the particular infant. As the child grows older the temperature of the apparatus is maintained at 84° or 80° F., and then the infant is placed inside only at night, being put in a warm basket during the day.

With incubators without automatic heat regulation the nurse must consult the thermometer placed alongside the child, and increase or decrease the heat by the means provided in the particular apparatus. With a little experience the nurse can judge by putting her hand inside the incubator whether the air is of the right temperature, but this must not be relied on.

The *moisture* is important. In incubators of the style last described this is provided for by hanging a piece of gauze in the water-glass of the moisture box at the left. Should the hygrometer or, what is just as reliable, the dry mouth and lips of the babe, show that moisture is needed, this may be easily accomplished by placing a small flat pan of water under the bed on the warming-pan. In incubators of the Auvard or Truax pattern the moisture is provided by a sponge hung near the head of the infant. This sponge must be wet frequently and sterilized daily, as it is not a clean thing. In summer less moisture is needed than in winter.

The hot-water system of the large steel incubators requires little attention. The filling is done through the cup on the right side, and the system must be filled and water stand in the cup before the gas-burner is lighted. Every day a little water is supplied to replace that lost by evaporation.

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In the old-fashioned incubators or in improvised baskets the hot-water bottles must be frequently changed. In those with steam boilers great care must be taken that the kettle does not boil dry. The Truax incubator (Fig. 136) requires three or four fillings of the boiler daily.

The Ventilation.—If the incubator is provided with a flue and wheel, or anemoscope, the nurse can easily see that air is passing through the apparatus by the motion of the wheel. This wheel must be delicate and sensitive, or it will fail to show the circulation of air. The nurse must see that the bearings of the wheel are free from dust and slightly oiled. Great care is necessary in handling it because of its delicacy. If there is no indicator of this kind, it is safest to leave the sliding cover or door open a trifle, and protected from draft by hanging a towel over it. This is necessary in summer in all apparatus not connected with the outside air. In addition the ventilator openings provided in the incubator are left free. In winter or in very windy localities those incubators connected directly with the outside air need a little watching. While experience has shown that they can accommodate themselves to a change from 45° above to 8° below zero, and also functionate in a gale blowing 60 miles an hour, still the little life inside is so delicate and precious that one must be assured the apparatus is working properly. In winter the damper in the air flue is kept almost closed, in summer wide open.

The Bed.—The incubator bed should be of eiderdown. No rubber sheet is used. No pillow is needed. Sometimes it may be necessary to lower the infant's head, which is done by raising the foot of the basket. Cotton has been found objectionable as a mattress for the tiny

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babies; it is used for the larger ones and after the little ones have developed.

The Dress.—This should be of the finest wool flannel obtainable, and made as simple as possible. The idea of wrapping the infants in cotton and oil is a popular fallacy

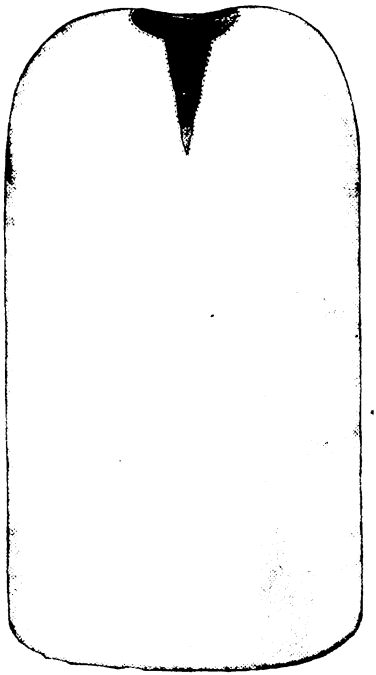


FIG. 141.—Incubator infant's dress.

and costs lives. As soon as a premature infant is born, it should be wrapped in warm wool flannel and placed in the incubator. If no incubator is at hand, until proper provision can be made, the child, wrapped in a warm woollen blanket, is surrounded by warm-water bottles,

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and kept in a very warm room. The nurse will note how the necessity of heat is emphasized. The Chicago Lying-In Hospital has received twenty or more infants, completely refrigerated, even though oiled and wrapped in cotton.

A simple bag, 34 inches long and 20 inches wide at the bottom, stitched around the neck, without sleeves, has been found the best (Fig. 141). It is open at the bottom, so that the infant may be "changed" without trouble, and

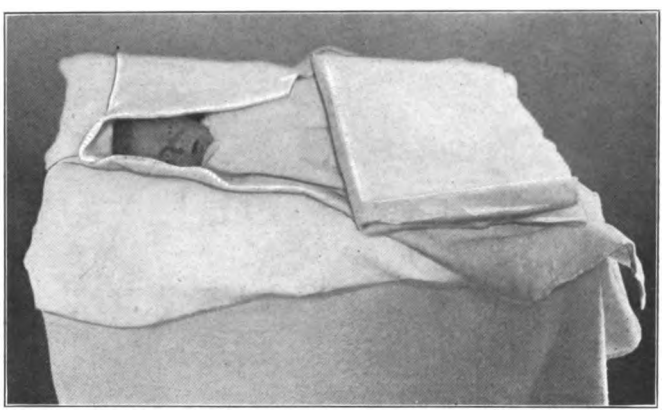


FIG. 142.—Incubator infant as it lies in the apparatus, showing the dress folded up over the body, making a blanket, and the shawl over the head and shoulders.

long enough to double over and make a sort of cover reaching to the shoulders. The child is covered by a light, wool-flannel blanket which makes a sort of hood over the head (Fig. 142); the abdominal binder is of wool, the diaper alone being of cotton material.

Warm Feet.—Even in the best incubators the child's feet may be cold; this is due to poor circulation. A warm-water bag should be laid under the feet, carefully protected so that it shall not burn. The temperature of

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the infant, taken by the rectum, may be elevated by this warm-water bag, a fact to be borne in mind in reporting or recording a fever.

The Diet.—Without question mother's milk is the food for premature infants, and should be obtained at any expense of money and effort. For this reason an incubator station is better connected with the lying-in hospital. Feeding must begin a few hours after birth to avoid exhaustion and to combat the great initial weight-loss.

For the smallest infants from 5 to 20 drops of a two-thirds mother's milk in water are given every thirty minutes with a medicine-dropper. If the child retains this, the amount is increased to 30 or 40 drops. After from twenty-four to thirty-six hours the intervals are lengthened to an hour, and later to two hours.

Diet-Table Used at the Chicago Lying-In Hospital.

For Infants Weighing Less than 3 lbs.

1st day, every 30 minutes, 15 drops: Water 1 part, milk 2 parts.
2nd " " hour, 30 " " 1 " " 2 "
3d " " " 40 " " 1 " " 2 "
4th " " 1½ hours 1 dram: " 1 " " 2 "
5th " " 1½ " 1 " Pure mother's milk.
6th " " 2 " 1½ drams " " "
7th " " 2 " 1½ " " " "

For Infants Weighing Less than 1800 grams (3 lbs. 12 oz.).

	Total quantity.		Every hour about
1st day	63 gm.	(2 oz. ½ dr.)	45 drops.
2nd "	127 "	(4 oz. ½ dr.)	75 "
3d "	151 "	(5 oz.)	1½ drams.
4th "	200 "	(6½ oz.)	2 "
5th "	224 "	(7 oz. 2 dr.)	2 " 15 ℳ
6th "	230 "	(7 oz. 4 dr.)	2½ "
7th "	263 "	(8½ oz.)	2 " 45 ℳ
8th "	281 "	(9 oz.)	3 "
9th "	303 "	(10 oz.)	3½ "

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For Infants Weighing from 1800 to 2200 grams, or 3 lbs. 12 oz. to 4 lbs. 9 oz.

	Total quantity.		Every hour about
1st day	120 gm.	(4 oz.)	75 drops.
2nd "	173 "	($5\frac{1}{2}$ oz.)	$2\frac{1}{4}$ drams.
3d "	247 "	(8 oz.)	2^{1} "
4th "	281 "	(9 oz.)	3 "
5th "	312 "	(10 oz.)	$3\frac{1}{4}$ "
6th "	347 "	(11 oz. 2 dr.)	$3\frac{3}{4}$ "
7th "	364 "	(11 oz. 7 dr.)	4 "
8th "	393 "	(12 oz. 5 dr.)	$4\frac{1}{4}$ "
9th "	404 "	(13 oz.)	$4\frac{1}{2}$ "

For Infants from 2200 to 2500 grams, or 4 lbs. 9 oz. to 5 lbs. 4 oz.

	Total quantity.		Every hour about
1st day	153 gm.	(5 oz.)	$1\frac{1}{2}$ drams.
2nd "	266 "	(8 oz. 5 dr.)	3 "
3d "	299 "	(10 oz.)	$3\frac{1}{2}$ "
4th "	341 "	(11 oz.)	$3\frac{3}{4}$ "
5th "	365 "	(11 oz. 7 dr.)	4 "
6th "	390 "	(13 oz. 5 dr.)	$4\frac{1}{4}$ "
7th "	400 "	(13 oz.)	$4\frac{1}{2}$ "
8th "	413 "	(13 oz. 3 dr.)	$4\frac{3}{4}$ "
9th "	418 "	(13 oz. 4 dr.)	5 "

One cannot follow this table exactly, some infants requiring less, others more, than herein stated; some infants require diluted milk for weeks. A small child that is several weeks old requires more than a larger infant in the first days. Occasionally a three-pound baby will drink an ounce of milk every two hours. As a general rule, the child is allowed as much as it can be induced to swallow, and the appetite varies day and hour. One must not overfeed, because of the danger of indigestion and regurgitation. The former invites intestinal catarrh, while the latter may lead to choking and asphyxiation. On the other hand, one must give sufficient nourishment, because the spark of life is faint and the child cannot express hunger. Feeding must, therefore, begin soon after

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birth, and be carefully and consistently practised. If the infant does not get enough food, it will lose weight, it will lie in a peculiar stuporous condition, and is subject to attacks of fainting, sometimes with marked cyanosis.

The amount of each feeding must be recorded, and if the infant nurses at the breast, it must be weighed on a delicate scale before and after nursing, the difference representing the amount obtained. The total in twenty-four hours gives the amount ingested by the infant. It should be equivalent to about one-fifth of the child's weight. Thus a child weighing three pounds should be fed about nine ounces of milk a day. If the child shows any symptoms of indigestion, a little peptic salt is given with each feeding (see further on).



FIG. 143. — The feeding dropper.

Method of Feeding.—If the infant can suck and swallow, the milk is given by means of a small vial and a tiny nipple. If the child can swallow but not suck, the milk is dropped into the throat with a medicine-dropper (Fig. 143). The breast-pump that draws the milk, the bottle, the dropper, the nipples, etc., must always be sterile to avoid infecting the intestinal tract.

Should the child neither suck nor swallow, it must be fed by means of a method known as gavage, introduced by Tarnier, of Paris (Fig. 144). This consists simply of feeding by means of a stomach-tube. The tube used is a soft-rubber catheter, size 8, American scale, for the tiny babes, and No. 10 for the larger ones. It is attached to a small

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funnel or the glass part of a nipple-shield. When the proper amount of milk is obtained, which is done by means of a breast-pump (Fig. 58), it is diluted and warmed,

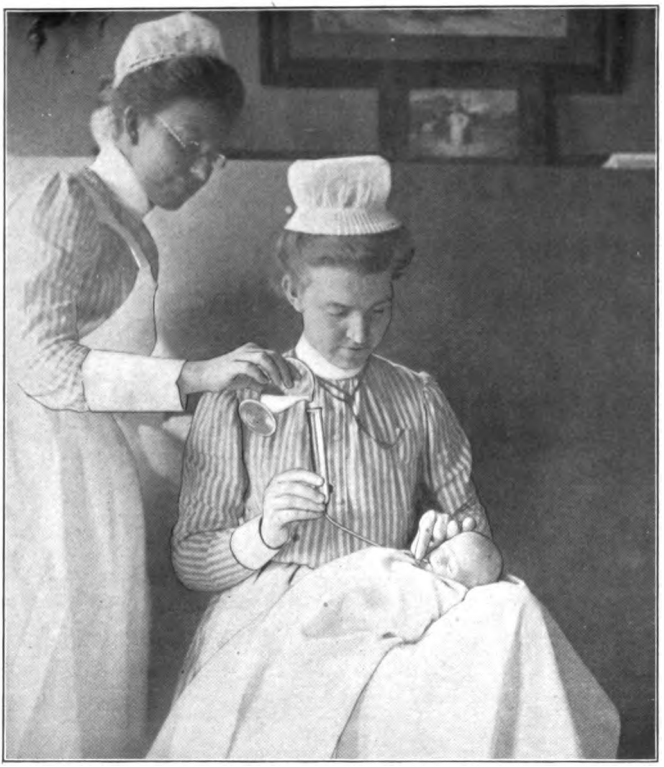


FIG. 144.—The practice of **gavage.**

and the tube, etc., sterilized. The infant is placed on the lap with the face upward and a little to one side (Fig. 144). The tube is filled with milk, clamped with the fingers, passed into the throat, and quickly into the stomach. A

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depth of four inches is usually right. The child swallows the tube sometimes with avidity. Then the measured quantity of milk is slowly poured in, taking care that air is not permitted to enter. Then the tube is withdrawn with a rather quick motion, the child is held quiet for a few moments, after which it is carefully replaced in the incubator on its side. The child must be watched for a few minutes to see that the milk does not regurgitate and strangle it.

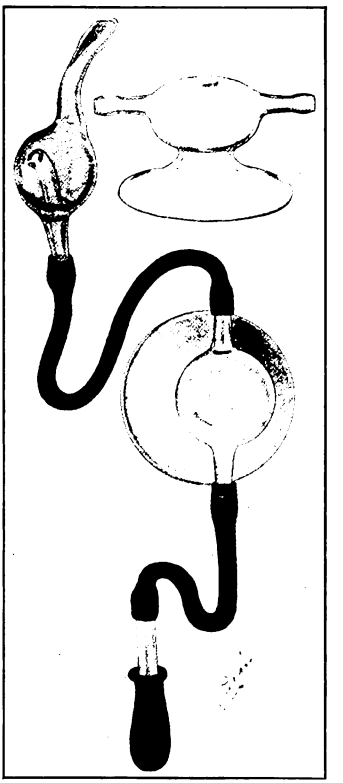


FIG. 145.—The teterelle, showing front and side view. Above and to the left is a glass bulb to collect saliva that might flow down the tube.

Overfeeding is very prone to occur with gavage, wherefore one must refer to the table herein given, and watch the infant for signs of distress, as abdominal distention, vomiting, indigestion, etc. Tiny infants are fed in the incubator through the side window or by partly removing the cover of those constructed on the box pattern, but after the child is strong enough, it is fed on the lap of the nurse, in a warm room, and protected from drafts. For gavage one must remove the infant from the couveuse.

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As soon as the babe can be put directly to the breast, this should be done, as nothing can match the life-giving



FIG. 146.—The teterelle in use.

fountain. If the nipple is too large, or if the milk does not flow readily, a teterelle may be used (Fig. 145). The nurse compresses the tube leading from the bulb with the

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fingers, the mother draws the milk into the bulb, and then the nurse allows it to flow into the child's mouth (Fig. 146).

One should see that the infant has sufficient water. Since the interior of the incubator is warm and the skin is thin, evaporation is rapid, and, therefore, the little body dries out.

If mother's milk is positively unobtainable, we are forced to rely on substitute feeding. At the beginning, whey and water, equal parts, are given, then pure whey, then a little cream is added. Tentatively, the child is given modified milk—all this under the doctor's direction.

The Bath.—Premature infants should be handled as little as possible, because it is depressing to them. A bath such as is usually given to infants may throw them into collapse. The practice of smearing the infant with vaselin or sweet oil is bad, as it refrigerates the little body. The skin must be kept clean and the pores open, or the infant will not thrive. As soon as the child is born it is covered warmly, and, in a hot room, the whole body is anointed with warm solid albolene. This is carefully and quickly wiped off, under cover, with a hot towel. The child is immediately placed in the incubator. If the infant is very weak, the first dressing is postponed several hours or until it has recovered from the shock of birth and the unavoidable exposure afterward.

Daily for the first week the whole body is anointed with finest benzoinated lard, an animal fat that sinks into the skin and furnishes a small amount of food. The face and buttocks are occasionally washed with warm water. When the infant is sturdier, it is given what is known as a "dip" every other day. This is a gentle immersion into water at 103° F. for not over a minute. Then the little

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body is quickly lifted into a warm towel and dried. After this the whole body is anointed with the benzoinated lard. The bath as usually given is not employed until the child is quite vigorous.

The Care of the Eyes, Nose, Mouth, etc.—The eyes are not given any attention except ordinary cleanliness, and the same may be said of the nose, ears, and mouth. Extraordinary care must be used not to injure or abrade the tender mucous membranes, as the infant is very susceptible to infection, which may easily gain entrance in this manner. Each morning the mouth may be washed with boric-acid solution, but this is not needed if the tongue is clean. In girls the vulva must be handled with extreme delicacy and care be taken not to infect it. The buttocks are so tender that the skin cracks and inflames easily, especially if the bowel movements, from indigestion or enteritis, are sharp and irritating. In such cases no water should be used, and the treatment described on page 310 should be minutely carried out.

In boys the diaper should be applied loosely, thus avoiding compression of the delicate external organs. The meatus should be inspected frequently, as a tiny bit of dried secretion might stop the flow of urine.

The infant must not lie long after urination or bowel movement before changing, first because the discharges decompose quickly in the warm incubator and befoul the air in it; second, because the skin around the nates will become inflamed; and third, because it may lead to infection of the child. The change must be made quickly and gently, with the smallest amount of exposure, and the child returned to the incubator without delay. Some incubators are arranged to allow this attention without removal of the child.

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General Care.—Every day during the anointing the infant is given a general massage. This comprises gentle rubbing of the skin, kneading of the muscles of the extremities, and bending of the joints. That this must be extremely gentle and tentative at the start and more vigorous as the child grows stronger it is not necessary to say. If the child is very premature, these attentions are given every other day. They are not omitted, because the infant needs some stimulation to bring it out of the torpid state in which it usually lies, and which disposes it to stagnation of the blood in the extremities and the lungs. The child should lie alternately on the two sides for the same reason. The temperature is taken by the rectum, morning and evening, and every four hours if there is fever. Every other day the infant is weighed naked, and care should be taken that the little body is not chilled. For the weighing the babe is wrapped in a hot diaper. A record is kept of all these things.

Removal from the Incubator.—This depends on the age of the child and the rate of growth. As a general rule, when the temperature remains normal for days; when the child is about four and a quarter to four and a half pounds in weight, we remove it to its cradle. This varies, of course, so the length of stay is from five days to six weeks. There should be no haste in removing the child, as it will thrive better in the apparatus, having less to contend with. Operative cases are removed when they have recovered from the shock of the delivery. Some infants, even though small, are uncomfortable in the incubator, and sweat profusely, cry, and are fretful. These cases, which are rare, do better in a warm crib. Often these symptoms denote fever due to some other cause, which, being relieved, the infant is comfort-

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able again in the incubator. The change from the incubator to the crib must be made gradually. If the incubator is of the box pattern, the lid is removed for part of the day. If the couveuse has automatic heat regulation, this may not be done, as opening the doors disturbs the thermostat; here the infant is gradually accustomed to being outside by being kept in a warm crib or on the nurse's lap for longer and longer periods. After a while it is placed in the incubator only at night, and if it bears this treatment well, it is left in the crib entirely.

THE PARTICULAR DISEASES OF PREMATURE INFANTS.

These children may have all the affections of full-term new-born infants. These illnesses are very severe, however, and the premature infant is subject to certain particular conditions.

After atelectasis, sepsis carries away most of these mites of humanity, and the nurse's main function is to guard against it at all points of entry. The entry is from the body orifices—mouth, nose, navel, especially the last—and from the gastro-intestinal tract and lungs. Infections of the navel are rare since the antiseptic treatment of the stump is practised. Infection through the lungs is not uncommon, but is hard to diagnose, as the symptoms of pneumonia are obscure. Fever is often absent, and there is no cough. A fatal epidemic of bronchitis was started in an incubator nursery from one of the wet-nurses who had caught an ordinary "cold in the head." Infection of the gastro-intestinal tract is easy to find, since there is usually diarrhea, with sharp, irritating, green, foamy, or offensive stools, and there are often fever, tympanites, and vomiting.

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The infection of the digestive tract may come from the mouth, from the air in the incubator, from the food given, from the fingers of the attendant, and from the bottles, nipples, etc., used. The importance, therefore, of absolute and constant cleanliness needs no emphasis.

The child sometimes suffers from simple indigestion. This is nearly always the case if bottle-feeding is necessary. Even with mother's milk it may occur, being due to insufficient digestive power of the tract. The little organs are not sufficiently developed. The symptoms of indigestion are vomiting, loose bowels, with curds, but with less evidence of fermentation in the stools, and progressive loss of weight. In treating these cases one must be sure that the infant is not being overfed. A small feeding is given several times to see if the stomach will tolerate it. The milk must be properly diluted The simple addition of "peptic salt" to the milk will often correct the condition. Peptic salt is made by mixing 1 part of finest table-salt with 9 parts of best scale pepsin. One-fourth of a grain is given with each feeding.

Thrush.—Thrush or sprue is commoner in premature babies than in others. It is due to uncleanliness and is preventable. The treatment recommended on page 299 is practised, but the nurse uses greater gentleness not to injure the delicate mucous membrane of the mouth.

Nasal Infection.—An affection which has been observed not infrequently at the incubator station of the Maternitè in Paris, but with which we have had no experience, is an ulcerative rhinopharyngitis due to decomposition of food, which the baby regurgitates into the nares. Profuse discharge from the nose, soon becoming purulent, ulceration of the mucous membrane even to the bone, with the development of "saddle-nose," similar

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to that of syphilis, are reported. Sometimes this infection causes a bronchopneumonia and general sepsis, The treatment is one of local cleanliness and antisepsis. which, however, is not easy to practise.

Cyanosis.—Another frequent condition is what we call "cyanotic attacks," or "blue spells." The infant suddenly ceases to breathe, turns blue, and may die unless immediate action is taken. Sometimes, however, the attack passes over and the infant regains its color, but is apparently weaker. These blue spells are due to two causes, which are directly opposite in their nature, wherefore it is difficult to treat the condition. First, they are the result of weakness: The little waif is too tired to pull, as Dr. O. W. Holmes says, "at the twenty-four oars of respiration." The babe simply forgets to breathe. The treatment of such a case is first to relieve the collapse by artificial respiration, a hot bath, and stimulation with a little coffee, a drop of whisky, or oxygen.

Since the cause of the cyanotic attacks is exhaustion, it is important that the infant receive sufficient food and that it be assimilated. The feeding must begin right after birth; food should be given in small quantities, and then in increasing amounts as the stomach will tolerate it.

The other causes of the cyanotic attacks are overfeeding and choking. If the stomach is overdistended, it interferes with the heart's action. Regurgitation of food may occur, when small particles may be caught in the trachea and strangle the infant.

To cure this condition, it is simply necessary to recognize the cause. To prevent the child from choking, the nurse must watch it very carefully until its actions are well known, and it must be laid gently on its right side after the feeding. The child may not be left alone for a

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minute. In these cases the advantages of a modern incubator are apparent, as one can keep the infant under constant observation.

Should the child be found choking, the nurse must at once hold it up by the legs, and, with the little finger, protected by gauze or a soft towel, seek to remove the obstruction from the throat. If this is not successful, the chest should be squeezed from before backward, in the manner illustrated in the section devoted to instruction for resuscitating asphyxiated babies. As a rule, these means suffice, but if they do not, the tracheal catheter must be employed to free the air-passages of obstruction. Needless to add, the accident is often fatal, owing to the delay and difficulty in dislodging particles that have once gained access into the lungs.

The most fatal complication of premature infants is **atelectasis pulmonum.** This means that the lungs of the child have not unfolded; the air, therefore, cannot get into them, and the child nearly always dies of more or less rapid asphyxia.

An infant whose lungs have not unfolded does not become red or pink, but retains a blue color. They are often called "blue babies," although this term should be reserved for infants born with heart disease. The atelectatic baby does not cry with vigor, but whines, and each expiration is attended by a grunt or a light groan. Unless the child can be made to cry vigorously and naturally and the healthy pink or red be brought back to the skin, it will almost inevitably die. Gradually it becomes unconscious, and dies in spite of every attempt to restore the natural breathing.

The means employed to cure the condition are the hot bath, getting the infant to cry by spankings and rubbings

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or electricity, artificial respiration, even forcible attempts to inflate the lungs with a catheter in the trachea.

Convulsions in incubator babies are due to asphyxia or to indigestion with toxemia, sepsis, and the causes acting with full-term children. (See p. 325 for details of treatment.)

In conclusion, a few words about the desirability of saving these weakling additions to society. Mothers often ask if the children grow up to be vigorous and strong, and the question may be answered in the affirmative. Many of the children nursed in the incubator system at the Chicago Lying-in Hospital are being kept under observation, and are thriving. Older statistics tell of the successful rearing of these undeveloped children, and to emphasize all, one may recall that Victor Hugo was a premature child, and was, in his own words, "colorless, sightless, voiceless, and so poor a weakling that all despaired of him save his mother."

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