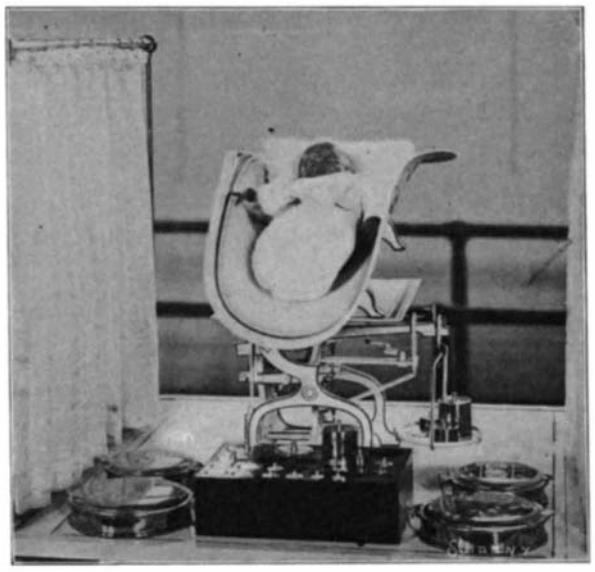
BABY INCUBATORS AT THE PAN-AMERICAN EXPOSITION.

Statistics show that only about 25 per cent of the infants prematurely or weakly born live ordinarily, but by means of the baby incubator of to-day the lives of about 85 per cent are saved. The baby incubator exhibited at the Pan-American Exposition is in a special building on the Mall near one of the entrance gates, and while it is in the nature of a concession, or in other words an exhibit, it has proved to be of great interest to visitors. In a large room, well-lighted, are a dozen incubators, each of which consists of a glass case in a metal frame, and supported on metal legs. In each is a small woven-wire cot carefully padded. Fresh air is admitted by a large pipe from outside the building. The air passes first through an antiseptic fluid which destroys any germs that may be lurking in it. It also passes through cotton, which filters out any physical impurities. The air is then warmed and is finally introduced into the chamber where the baby lies. A pan of warm water keeps the atmosphere humid and the amount of moisture is registered by a small hygrometer at one side of the incubator. The air enters at the bottom of the case, strikes a shield below the cot and is deflected downward until it meets the warm current of air heated by a Bunsen burner placed outside the case. The temperature is automatically regulated by a thermostat. At the side of each case is a small boiler which holds about two gallons of water. Through the proper introduction of cold water the circulation is controlled in the pipes that heat the incubator in the same manner in which it is done in a house heated by hot water. A centigrade thermometer in front of each incubator gives the actual temperature all the time. Each infant is swathed, German-fashion, and they can be clearly seen through the glass doors and sides of the various incubators. The infants are sent by the physicians of Buffalo and are given over to the care of the institution. They are weighed, clothed and placed in the incubator. They are usually under five pounds in weight on admission. The babies are taken out of the incubators every two hours to be fed by the nurses who live in the building.

At the rear of the incubator room is a model nursery, which is shown in one of our engravings. A miniature elevator takes the infants to the upstairs quarters to be fed. Most of the babies lie with their eyes closed, and practically the only sign of life is the occasional flutter of one of the tiny hands. In accordance with the European custom the boys are distinguished by blue ribbons and the girls by pink. The infants at the Exposition are not from institutions, but are from private families, so that the names of the little patients are carefully kept from the public. Above each incubator is a card on which is given the child's initials, the date of its birth, its admission to the incubator, the circumstances that makes artificial care advisable, its weight and any other detail of significance. The incubator was invented about sixty years ago, but it never came into general use until 1878, when incubators were installed at the Paris Maternity Hospital. Both Berlin and London have permanent institutions similarly equipped and in successful operation.

MODEL NURSERY AND ELEVATOR FOR INFANTS.



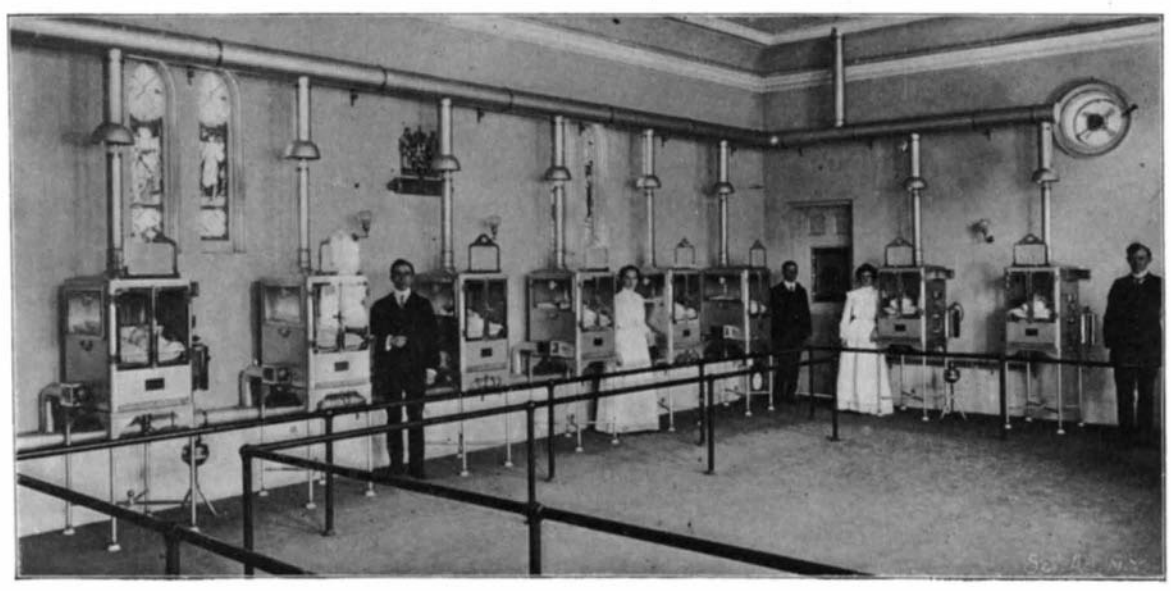
WEIGHING AN INFANT.

The Question of the Alcohol Motor.

Now that the question of the alcohol motor is receiving great attention, it may be interesting to note the resumé of the subject which M. Gustave Chauveau, a prominent engineer, presents in Le Chauffeur. According to M. Chauveau, the situation of the alcohol motor question may be summed up as follows. Scientifically speaking, there exist two opposite parties, the anti alcoholists and the pan alcoholists. The former hold that the motor used being the same as that for gasoline, its thermic efficiency should be sensibly the same, and in consequence the relation between the respective consumption of gasoline and alcohol for the same power should be virtually equal to that of the calorific power of these combustibles. Gasoline gives about 11,000 calories per kilogramme, or 7,700 per liter, and 90 deg. alcohol gives 5,100 and 4,200 calories respectively. A motor using alcohol should consume, in volume, about $7,700 \div 4,200 = 1.8$ times as much as gasoline for equal power. The petroleum motor demands at least 0.500 liter per effective horse power hour, and to obtain the same result 0.900 of alcohol (90 deg.) is needed. To sum up, as the price of alcohol per liter is somewhat more than that of gasoline, it would cost at least double to use it, and therefore the alcohol motor is not possible industrially. This is the conclusion of Messrs. Hospitalier, Ringelmann and others. The pan-alcoholists, such as Arachequesne, Petreano, etc., reply that this reasoning does not hold good, as practically a good alcohol motor does not consume 1.8 times more alcohol than gasoline, as is shown by the recent trials of automobiles. The question rests there at present, but it is time that it should be definitely resolved; the great number of documents recently obtained concerning the alcohol motor makes possible an explanation of the mystery which seems to surround it.

Taking up the reasoning, logical in principle, of the anti-alcoholists, we may compare the alcohol motor this time with the gas motor. As a petroleum motor is nothing more than a gas motor, its thermic efficiency should be about the same. A gas motor now easily gives an effective horse power hour with 500 liters of illuminating gas, or 2,000 liters of blast-furnace gas, representing a mean of 2,625 calories. As 90 deg. alcohol gives (as above) 4,200 calories per liter, there would be needed $2,625 \div 4,200 = 0.625$ liter of alcohol for the horse power hour. As gasoline requires 0.500 liter, the relation for an equal power is $0.625 \div 0.500 = 1.25$ instead of 1.8 as above. Let us analyze this result and see if it is plausible. The admitted consumption of 0.500 liter of gasoline per horse power hour is normal and regularly obtained by the motors of automobiles. The consumption of alcohol, 0.625 liter, has been already realized in the celebrated experiments made in Germany in 1897 upon a Korting motor of 6 horse power. This result has never been disputed since, and therefore seems as worthy of confidence as the others. This remarkable efficiency is explained by the adaptation of alcohol to an excellent fixed motor, utilizing the heat of the exhaust in a notable proportion. In automobile motors, less favorable, consumptions below 0.900 have already been observed. The results obtained by the Société des Agriculteurs with a Brillié motor should be noted (in the case of alcohol). Using three liquids, first gasoline, second carbureted alcohol at 50 per cent and third 90 deg. alcohol, the brake horse power developed was 7.32, 7.67, and 7.33 (or nearly the same), while the consumption per horse power hour was 0.677, 0.735 and 0.835 respectively. The data given by the automobile tests, while favorable for alcohol, cannot be used in this connection, as the conditions are not always the same. It should be noted that from the last set of figures we obtain $0.835 \div 0.677 = 1.23$ as the ratio of consumption of gasoline and alcohol. But how, then, do we explain the apparent anomaly between the results of comparing the alcohol motor to the petroleum motor on the one hand and to the gas motor on the other? The explanation, which is simple, is that the petroleum motor has in the actual conditions of practice a thermic efficiency inferior to the gas motor, as is admitted. The alcohol motor may, on the contrary, have, not the extraordinary efficiency claimed by some, but at least equal to that of the gas motor. To resume, if the petroleum motor may in theory claim a consumption below 0.500 liter and 1.8 times less than for alcohol (0.625 liter), it does not seem in practice to arrive as near its theoretical figure as alcohol, whence the relative advantage of the latter.

M. Chauveau thus reaches the following conclusion: First, in actual practice the gasoline motor cannot claim normally less than 0.500 liter per effective horse power hour, while the alcohol motor may approach 0.650. Second, the practical relation of the consumption of the two liquids may be reckoned at 1.33, or one third more for alcohol to obtain the same power. Third, with the price of 90 deg. alcohol (in France) at three-fourths that of gasoline, the cost per unit of power comes to about the same. Fourth, in the case where by a new method the petroleum motor is given the efficiency of the gas motor, or consumes 0.350 liter per horse power hour, the relation of consumption alcohol: gasoline will be 1.8.



BABY INCUBATORS AT THE PAN-AMERICAN EXPOSITION.

What is said to be the swiftest-timed short-distance train in Great Britain now is run upon the North-Eastern Railway, making an average speed of—from start to stop—60 miles per hour. The grades are very light, however, 1 in 5,700 and 1 in 2,400 feet, respectively, and the train weighs only 120 tons, while the engines are said to be very powerful; the drivers are 80 inches diameter. In a run of 26 miles the speed attained was at the rate of 73 miles per hour.