ceived repeated injections of solutions of glucose, the mesothelium undergoing certain changes of a morphological character which were not followed by adhesions. It seemed important to determine to what extent such changes could be produced without sufficient injury occuring to cause the development of adhesions. Such experiments have been carried out by the repeated introduction into the peritoneal cavity of various types of mild irritants, the best results having been obtained with laked heterogenous blood. Cats were given injections of 10 to 20 c.c. of laked rabbit's blood made isotonic with NaCl, the dose being repeated twice weekly over a period of 3 to 6 months. In such animals when the procedures were carefully guarded to prevent undue injury on puncture of the abdominal wall, and precautions taken to avoid any septic involvement, there resulted very remarkable changes in the entire mesothelial membrane without the formation of a single adhesion.

The peritoneum on section was often made up of two or three layers of cuboidal or columnar cells, attaining at times a thickness of 20 micra, and yet such a peritoneal lining seemed entirely adequate to prevent the formation of adhesions. From such observations the conclusion seems wholly justified that the presence of a complete layer of peritoneal lining cells, no matter how much their morphological appearance may be altered by such irritations as those used, is entirely sufficient to prevent the adherance of the two layers of peritoneum and thus prevent adhesions.

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Note on the permeability of the placenta in the rabbit.

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The observations of various anatomists have shown very clearly that there are wide variations in the structure of the placental barrier in such species as the ungulate, the carnivora the rodentia, the chiroptera, and primates. Grosser[1] classifies

[1] Grosser, O., Vergleichende Anatomie und Entwicklungsgeschichte der Eihäute und der Pacenta, Leipzig, 1909, W. Braumüller.

the placentalia in terms of the layers of tissue which separate the maternal from the fetal blood-streams; but it must also be noted that the same layer of tissue may be of very different morphology in different species. In view of these differences it seems unfortunate that the vast majority of observations which have been made upon the passage of any substance from mother to fetus, or the reverse have been carried out on single species.

Among the few observers who have made comparative experiments on different species are Römer[2] using tetanus antitoxin, and Wislocki[3] using vital dyes. Römer found that the antitoxin passed readily in the human, occasionally in rodents, and never in sheep or cows. Wislocki found that trypan blue passed in small amounts in the rabbit and guinea-pig, but never in the cat and dog. In his discussion he suggests that both his and Römer's results may be dependant upon the varying complexity of the placental barrier in the animals studied.

Experiments have been reported elsewhere[4] in which it was shown that sodium ferrocyanide passed through the placental barrier in the cat from mother to fetus, while iron ammonium citrate was held up by some mechanism located in the fetal ectoderm. Further experiments have demonstrated that in the rabbit both the salts passed from mother to fetus, but it was found that the sodium ferrocyanide passed the placental barrier somewhat more easily than the iron ammonium citrate; this was shown by the fact that the ferrocyanide appeared in the fetal blood before the citrate, and always remained in greater concentration.

The placenta in the rabbit belongs to Grosser's hemo-chorionic type, while that of the cat is endothelio-chronic. But in addition to having an intact maternal endothelium the cat's placenta has a much thicker and more complex chorionic ectodermal layer than that found in the rabbit. It is possible that with the simplification of the placental barriers there is a decreasing amount of placental control; and a more widespread reduction of the activities of the placenta to the laws of osmosis and dif-

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2 Römer, A., *Beitr. z. exper. Therap.*, 1904, H. 9.

3 Wislocki, G. B., Contrib. to Embryol., No. 62, Carnegie Publ., No. 276, 89-101.

4 Cunningham, R. S., *Amer. Jour. Phys.*, 1920, liii, 488-494.

fusion. Considering, however, all the evidence up to the present time, it seems probable that even in man the placenta does furnish some regulatory activity, while in some of the more complex types this control is much more elaborate.

These results with sodium ferrocyanide and iron ammonium citrate considered in connection with those of Römer and Wislocki indicate the advisability of extending, as far as possible, the investigation of each type of substance to as wide a group of different placental barriers as possible. This seems especially important in regard to those investigations involving the careful chemical estimation of the normal constituents of maternal and foetal bloods which so far have been studied chiefly in the human.

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Carbon dioxide and the HCO_3 ion as specific respiratory stimulants.

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It has been noted by Howell, Collip, Dale and Evans, the author and others that the intravenous injection of sodium bicarbonate may act as either a respiratory or circulatory stimulant, eliciting hypernea or a marked rise in the blood pressure. Such injection obviously increases the hydrogen ion concentration of the blood and inasmuch as it produces a slight dilution, it decreases the amount of carbon dioxide in the blood eliciting the stimulation. The increased respiration is, therefore contrary to the usually accepted laws of respiration. The only apparent change in the blood which might elicit stimulation is the greatly increased number of HCO_3 ions. Collip, therefore, suggests that the HCO_3 ion exerts a specific stimulating action on the respiratory center.

We believe, however, that this anomalous result may be otherwise explained. When the carbon dioxide is dissolved in water