

closing. Technical difficulties with the method have also delayed the report of results of the effect of adrenalin, pituitrin, nitrates and other drugs, but these studies are now under way.

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**Decerebrate Preparation (maternal) for Direct Observation of  
Unanesthetized Mammalian Embryo.**

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In order to study the living mammalian embryo with placental circulation intact and without the disturbing effects of anesthesia, we have made decerebrate preparations of pregnant rabbits under light ether anesthesia. After transecting the thoracic cord to prevent undue reflex movements of hind limbs, anesthesia is discontinued. The uterus exposed by abdominal incision, is opened by longitudinal incision in the relatively avascular region, opposite to the placental attachment. Embryo in transparent amniotic sac is extruded by the contracting uterus, but placental attachment is usually not disturbed. Amniotic sac may now be opened. The embryo is kept moist and warm by a constant drip of warm Ringer's solution. Great care must be used not to place the umbilical cord under tension. A camel's hair brush is useful for manipulation. Such preparations kept moist and warm may be continuously observed for at least two hours and probably longer. Even after the placenta was completely separated from the uterus, some of our small rabbit embryos (9-25 mm. crown-rump length) have survived more than an hour. We believe such preparations will be useful for a variety of studies.

The smaller embryos, up to 13 mm. crown-rump length, are almost completely transparent except for liver and heart, and are particularly suited for transillumination (the heart beat, easily visible to the naked eye, was 50 to 60 per minute in three preparations). For this purpose the embryo with placental circulation intact is placed directly upon the substage condenser of a binocular microscope and transilluminated from below. (It was found convenient to mount the microscope, disconnected from the condenser, on an adjustable stand.)

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We have made the following preliminary observations on the cerebral circulation :

The growth of the cerebral vascular bed from the 9 mm. crown-rump length to the 25 mm. crown-rump length is striking. In the smaller embryo the difference in caliber between main arterial trunk and capillary is relatively slight. After few divisions the artery leads into a simple capillary network which again reunites to form a large vein without apparent anastomosis with other vessels.

Much more complicated is the cerebral vascular bed in embryos of 25 mm. crown-rump length. Here the large arteries and veins are broader and the capillaries appear to be narrower than in the smaller embryos, while the complex capillary bed is separated from the main vessels by a larger number of branches of intermediate size.

In the smaller embryos under magnification of 20 diameters we have obtained beautiful stereoscopic views of the entire cerebral circulation. The deeply placed pulsating arterial flow is readily distinguished from the more superficial and steadily streaming venous flow.

With higher magnifications (100 to 335 diameters) the smallest capillaries appear as minute channels in the cerebral substance through which the red blood cells can be seen to pass but one at a time. Even the endothelial nuclei of the capillary wall may be seen in suitable fields.

This method makes it possible to observe the development and physiology of the cerebral circulation in the *unanesthetized* mammalian embryo with *cranium intact*. Further studies will be carried out in this laboratory.

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### Certain Physico-Chemical Characteristics of Muscle Globulin.

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The significance of the protein constituents of muscle for the contractile process has long been recognized. The instability of these bodies, however, has rendered difficult their characterization. Danilewsky<sup>1</sup> described the extraction of muscle protein with sal ammoniac in 1881. The older method of expression, despite rigid