cases of pernicious anemia gave 60, 52, 47, 63, 55, 67, 63, 63, 62%, with an average phytotoxic index of 59%, while the phytotoxic index obtained from 8 cases of essential achylia gave 82, 95, 83, 82, 79, 82, 88, 90%, with an average index of 85%. All the 8 cases of essential achylias were of a very severe type, that is to say, each failed to respond with acid secretion to injections of histamine. The difference in toxicity in the 2 sets of cases bears no relation whatever to the hydrogen ion concentration of the solutions used as these were practically the same after the dilutions in physiological saline had been prepared. This difference in the readings between the achylias of pernicious anemia and those of idiopathic or essential type promises to be of diagnostic value. The toxicity of stomach washings from pernicious anemia cases is furthermore of interest in relation to various theories concerning the etiology of that baffling disease.

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Growth and Differentiation of Rat Embryos on the Chorioallantoic Membrane of the Chick.

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The experiments previously reported[1] have shown that rat embryos possess the potency to undergo a development of their tissues when implanted in strange surroundings. In order to test further the capacity of the embryonic parts for differentiation, transplantations of 8 and 9 day rat embryos have been made to the chorioallantoic membrane of the chick. This experiment was first performed by Hiraiwa[2] using rat embryos of a considerably older stage of development. He found that there was a considerable degree of self-differentiation in this form.

Up to the present about 200 such transplantations have been made; the eggs have been incubated from 7 to 9 days after transplantation (9 day hosts) and the grafts studied. In many cases the transplant causes only a minor reaction which is indicated by a slight thickening of the membrane on the site of the operation and a slight increase in the vascular field. This is the so-called

[1] Nicholas, J. S., PROC. SOC. EXP. BIOL. AND MED., 1931, **29**, 188.

[2] Hiraiwa, Yoshi Kuni, *J. Exp. Zool.*, 1927, **49**, 441.

membrane reaction. In some cases a distinct nodule of tissue is found which upon section shows degenerating embryonic tissue. In these cases there are no embryonic parts except isolated tissue fragments.

In the positive series, containing embryonic parts, there are two groups: (1) those in which there is rapidly differentiating tissue and (2) those in which the tissues have developed exceedingly well but have undergone subsequent degeneration. So far we have had the opportunity to study the sectional material from 6 of these cases. Of these only one shows tissues undergoing differentiation at a rapid rate with a negligible amount of degeneration; 4 cases show the mixed type in which some of the tissues are undergoing differentiation and some are degenerating, while the sixth case shows practically complete embryonic degeneration.

The most favorable case shows not only that the tissues are capable of undergoing differentiation but that combinations of tissues are also possible in embryos developed under these conditions. Perfectly formed ear vesicles with nervous and membranous constituents are found together with heart, liver, gut, nervous tissue, muscle, and the supporting tissues.

At the stages used for the grafts, there is little tissue differentiation and no organ formation. A 9 day embryo is in the open medullary plate with the mesoderm undergoing segmentation to form the myotomes. In every case showing development, differentiation had progressed far beyond the stage of transplantation.

1. Early rat embryos (8 and 9 days) when transplanted upon the chorioallantoic membrane of the chick may undergo a definite differentiation of their tissues during the ensuing period of incubation. Heart, ear vesicles, liver, gut and supporting tissue may undergo their formation in such grafts.

2. Organization of tissue elements into definite morphological units has been secured. This shows that the organizing capacity is present even when the embryonic rudiments are developing under abnormal conditions of temperature, pressure, and with foreign nutrition through the blood supply of the chick.