the wave lengths of the positions of selective absorption fall in most instances further towards the violet end of the spectrum at approximately λ 250 mμ, 335 mμ, 370 to 380 mμ, and λ 460 mμ.

The pigment in the concentrations studied is optically inactive or nearly so.†

Crystals were obtained from a water solution of the pigment obtained from the methanol solution. The photomicrograph of the tufts of fine needle-like crystals is presented in Fig. 2 and resembles that of the photoderivative of the pigment component of the yellow enzyme.[6]

Since the tufted arrangement of the crystals in Fig. 2 is somewhat different from that of the photoderivative of the pigment component of Warburg's yellow enzyme, and since the absorption spectrum of the methanol solution of pigment isolated from diphtheria filtrate indicates selective absorption at slightly different wave length values than those published for flavins, it is possible that the flavin synthesized by the diphtheria organism is an unidentified flavin.

10851 P

Experiments on the Mechanism of Gastrulation in a Frog's Egg.

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In the experiments here reported we have attempted to analyze the factors responsible for the turning in (involution) of the dorsal lip of the blastopore. Spemann[1] states that the dorsal lip possesses an inherent capacity to turn in, although under certain abnormal conditions it may fail to do so, growing out into a horn-like projection. Vintemberger[2, 3] found that the chordal material has a weaker capacity to turn in than the prechordal portion, which lies just below the former. The chordal material is, according to this author, aided in its involution by its attachment to the prechordal material.

† The small quantity of material available for this study did not permit the estimation of the quantity of flavin in the toxic filtrate. Further details will be presented in a report to be published elsewhere.

1 Spemann, H., *Embryonic Development and Induction*, 1938, p. 105, Yale University Press.

2 Vintemberger, P., *Compt. Rend. Soc. de Biol.*, 1938, **127**, 435.

3 *Ibid.*, **127**, 436.

In the present experiments the early gastrulae of *Hyla regilla* were used. In a first series of experiments various portions of the dorsal lip were transplanted into the roof (presumptive ectoderm) of other early gastrulae (Fig. 1). The material immediately around the blastopore (circum-blastoporal material, Fig. 1) invariably invaginates to form a deep archenteric sac. However, *the mesoderm above this region* (external mesoderm, Fig. 1) *has little or no capacity to involute, whether it is transplanted alone or in combination with the internal mesoderm or the circumblastoporal material.* Under the above conditions the chordal material (present in external mesoderm, Fig. 1) grows out into a horn-like projection. Our results are apparently contradictory to Vintemberger's, who found that the presence of the prechordal material aids the chordal material in its turning in. In our work with *Hyla* we wish to emphasize that the chordal material did not turn in, in spite of its attachment to the prechordal region or to the internal mesoderm.

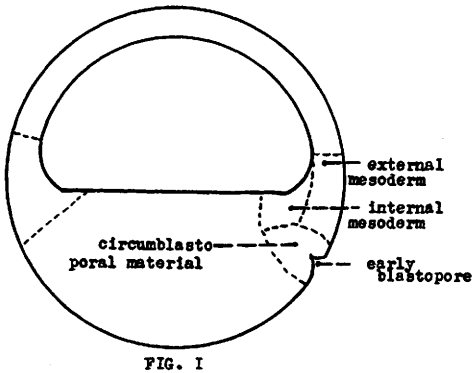

FIG. I

Showing parts of early gastrula transplanted in experiment one.

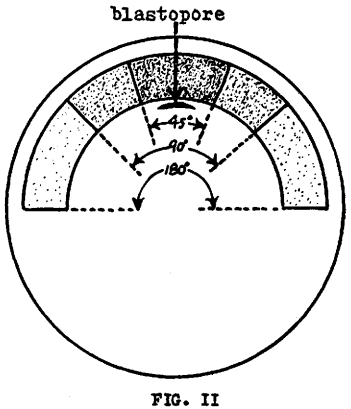

FIG. II

Ventral view showing parts of early gastrula transplanted in experiment two.

What, then, are the conditions necessary to bring about the normal involution of the mesoderm? An answer to this question is suggested by a second series of experiments indicated in Fig. 2, in which only the external mesoderm was transplanted. The smallest transplants (45°, Fig. 2) failed to involute, growing out into fingerlike extensions. Wider transplants (90°, Fig. 2) also developed projections, but these were clearly shorter than the above. The widest transplants (180°, Fig. 2) formed only minute projections. The greater part of the transplant turned under and induced a secondary neural plate almost equal to the host's in size. These results corrobo-

rate the statements of Spemann[1] and Vintemberger[2] that a transplanted dorsal lip involutes better in the marginal (mesodermal) region than in the roof of the egg. These results emphasize further that the successful involution of the dorsal lip depends specifically upon its attachment to laterally located mesoderm, rather than upon its relationship to the egg as a whole. Thus, a dorsal lip will involute well even when placed into the roof (ectoderm) of the egg, provided however that it is accompanied by a sufficient quantity of laterally located mesoderm.

Summary. Our work with *Hyla regilla* shows that the mesoderm of the dorsal lip of the blastopore has little or no inherent capacity for involution. The material immediately around the early blastopore (the pharyngeal endoderm and prechordal mesoderm), although itself having a strong capacity for involution, does not bring about the involution of the mesoderm above it. On the other hand, *excellent involution of the dorsal lip mesoderm occurs when it is transplanted together with laterally located mesoderm.*

10852 P

Vaccination of Monkeys with Agar-Tissue Cultures of European Rickettsiae.

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In a previous paper, we reported the successful vaccination of guinea pigs against European typhus, using agar-slant tissue cultures.[1] Since guinea pigs do not give a Weil-Felix reaction, and since they show very little other than a temperature during the course of a typhus infection, it seemed desirable to test our vaccine on animals which more nearly resemble man in their reactions. Three *Macacus rhesus* monkeys of approximately the same size were selected. One was reserved as a control, the other 2 were vaccinated with formolized vaccine prepared in the following manner: Rickettsiae of classical typhus were grown with minced mouse embryo tissue on agar slants for 7 to 9 days. The tissue was removed from the slants and ground in a small mortar, after which 3 cc of 0.2% formolized saline were added for each slant. (For human use, we rec-

1 Zinsser, H., FitzPatrick, F., and Wei, H., *J. Exp. Med.*, 1939, **69**, 179.