that a severe wound which the fish had received from a metal fitting in the tank, four or five days previously, had left a fairly deep cavity filled with blood-clot, completely destroying the right spiracle and surrounding area.

The organs seemed to be quite normal except the gall-bladder, which had apparently been perforated by the injection needle.

The base of the brain revealed a peculiar type of pituitary body. The ventral, nervous lobe, with its connecting stalk and infundibulum, seemed slightly smaller than usual in this fish; the vascular body (situated dorsally to the nervous lobe, between it and the brain) was smaller than usual, displaced laterally and seemed to be grafted on to the right angle of the optic chiasma. In the normal fish, the two lobes are in contact, but can easily be separated. In this one the gap was evident.

Histologically, both lobes appeared normal, but in the vascular body chromophobe cells tended to prevail.

No trace of traumatic lesion of the roof of the mouth was found, and the aspect of the gland seemed to point to a congenital condition.

The congenital malformation of the gland might explain the insufficiency of the pigmentary system merely by lack of its development, or perhaps the gap between the two lobes prevented proper circulation between them.

The fish reacted to the posterior pituitary extract in the same way as the hypophysectomized fish, as observed in successful operations performed on normal dogfish during the course of injections mentioned.

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Self-arrangement in the Mitotic Spindle under Mechanical Influence

IN a previous communication[1] it was pointed out that in all types of protoplasm hitherto used, fibrils or linear units are really present, although only visible if the protoplasm is flowing through the capillary of a deformation apparatus.

The following are more recent observations concerning the appearance of the mitotic spindle fibres after *mechanical* gelation of the anaphasic nucleus. No traces of spindle fibres are to be seen at any stage of mitosis in living connective tissue cells cultivated *in vitro* under the usual conditions[2]. But they become visible as soon as acid is added (M. R. Lewis), or when a similar gelation is brought about by means of a gentle rapping or pressure of the culture (J. Ellenhorn[3] on living cells of *Tradescantia*), or by a stretching of the jelly film of the culture spread out within a little glass frame (H. H. Pfeiffer). All recent evidence supports the view that the spindle is a comparatively rigid structure. Experiments of R. Chambers show quite clearly that it is like an *elastic gel* capable of considerable mechanical distortion.

It is generally assumed that the energy for movement of the daughter chromosomes towards the poles is derived either from the spindle, the fibres of which are looked upon as contractile fibrillæ (*Zugfasern*), or from a body driving asunder the chromosomes (*Stemmkörper*). The spindle fibres have been proved to exist as positively doubly refractive bodies between crossed nicols[4]. Such a phenomenon cannot occur except by a flowing or pulling process. Therefore, W. J. Schmidt supports the hypothesis of contractile pulling, and compares the spindle fibres with other contractile fibrillæ of protein nature showing positive double refraction[5]. This comparison, however, may not be valid, because the anaphasic chromosomes moving towards the pole intersect the spindle fibres in spite of their rigidity. From observations between crossed nicols it seems correct to conclude that the spindle fibres arise in a similar way to Zocher's tactoids[6]. In the geloid stage of the mitotic nucleus the anisotropic particles may approach each other owing to a dehydration process, but the contractibility of the fibres does not explain the mechanism of the movement of chromosomes.

From a theoretical point of view, there is a number of interesting problems involved in the physics of a dividing cell nucleus, and I hope to give a detailed communication of my experiments at the Fifth International Congress for Experimental Cytology at Zurich. At present I wish to show that, owing to a weak mechanical influence, in the nucleus of mesenchyme cells of *Salamander* embryos cultivated *in vitro*, distinct spindle fibres with positive double refraction arise and give further evidence for anisotropic and linear structure within the cell.

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Interaction between Cell Nucleus and Cytoplasm

THE assumption has been made frequently that the genes exert their effects upon the cytoplasm during the 'resting' stage of the cell. This implies that nuclear end products of genic reactions can pass through the nuclear membrane or at least react with cytoplasmatic components at the nucleo cytoplasmatic interphase. However, no explicit demonstration of this assumption has been given as yet. On the other hand, it has been proposed, again without proof, that the genic end-products in the nucleus are released into the cytoplasm during the mitotic breakdown of the nuclear membrane only.

It is the purpose of this note to indicate that the two opposing views can be tested and that data are available for a decision. If the genetic constitution of a cell is changed, and if a cytoplasmatic effect of the new constitution becomes apparent in this single cell before nuclear division has occurred, it is obvious that the gene concerned has interacted with the cytoplasm during the resting state of the nucleus. If, on the other hand, the cytoplasmatic effect of a changed genetic constitution becomes visible only after nuclear division and in the two ensuing daughter cells, then the conclusion is suggested that the disappearance of the nuclear membrane is necessary