years, each fragment generally doubling its volume in 48 hours. In 10 years, more than 30,000 cultures have been derived from a fragment of heart less than 1 cubic millimeter in size. This demonstrates first, that the cells transform the food stuffs in their medium into protoplasm. Second, under the conditions of the experiments, the cells are no longer subject to the influence of time, as they are when living within the organism, and demonstrate that they are potentially immortal. The cells have now exceeded the average life of chickens, which disposes of criticisms on this point.

Pure cultures of cells are important in studying biological problems. The strain responds readily to changes in the composition of the culture medium by modifying its rate of proliferation. By perfecting the technique, it could be used as a reagent for detecting substances contained in the humors which have the power of activating or decreasing the rate of cell proliferation, and further, to investigate the interactions of the cells and their medium, which are still incompletely known.

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Bio-radiological studies.

By **HERBERT RUCKES** and **ARTHUR W. FUCHS** (by invitation).

[*From the Department of Biology, College of the City of New York.*]

Animals in which arteries, veins and ducts of various organs are injected with salts of heavy metals, such as mercury, barium, lead, gold and silver are skiagraphed and subsequently studied in either plane view or by means of stereoscopic rœntgenograms. The method is especially valuable for the study of animals from the view point of comparative anatomy, Such preparations show clearly first, the general construction of the arterial or venous system and secondly the minute ramifications of the respective arteriole systems on and within the organs. Probably the most valuable use that this method has is in the study of developing systems and ducts in embryos. Here the homologies of the embryonic blood vessels and the adult arteries and veins can readily be demonstrated.

Barium sulfate and litharge are the best injection media. Baruim sulfate is prepared by precipitating it from barium hydroxide with ammonium sulfate, the precipitation being done at about 57° C. This gives a very fine flocculent mass that will enter many of the smaller arteries and veins. An aqueous suspension is used. Red lead and litharge are employed in either aqueous suspension or in oil.

The plates are exposed to the x-rays varying lengths of time depending on the size and density of the object and the amount of current used.

The paper is illustrated with lantern slides of the prepared objects.

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The selective bacteriostatic activity of sulfanilic acid.

By JOHN W. CHURCHMAN.

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In a recent communication to this Society report was made of a selective bacteriostatic property exhibited by acid fuchsin. From a study of the effect of this dye on spore-bearing gram-positive aërobes and on the commoner gram-negative bacteria its selective activity was shown to be just the reverse of that exhibited by gentian violet and the other basic tri-phenyl-methane dyes: the latter kill the gram-positive aërobes and spare gram-negative bacteria, while acid fuchsin kills the gram-negatives and spares the gram-positive aërobes.

Magenta is one of the basic tri-phenyl-methanes and has the same effect on bacteria as gentian violet. From magenta, acid fuchsin differs only (so far as chemical structure is concerned) by the presence in its molecule of sulphonic-acid groups. Since the two dyes are—with this exception—identical, and since they have—so far as gram-positive aërobes and the commoner gram-negative bacteria are concerned—exactly opposite effects, it was clearly indicated to determine whether the sulfonic acid groups in acid fuchsin were responsible for its ability to kill gram-negative organisms while sparing gram-positive aërobes.