of sunlight. The regions of unusual craters such as Tycho, Copernicus, Theophilus and those around Mare Serenitatis and Mare Imbrium are described more fully in the final chapter of the book. The whole text is in the form of a dialog between the author and a friend who starts with no knowledge of the subject.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

THE DISSECTION OF THE SPIRAL VALVE OF SQUALUS ACANTHIAS

A SATISFACTORY dissection of the spiral valve of *Squalus acanthias* usually proves to be a difficult task for students of comparative anatomy. In order to expose enough of the valve to make its analysis possible, a considerable portion of the intestinal wall must be removed. If the method of dissection employed involves the removal of a single longitudinal strip of the intestinal wall extending the length of the intestine, it follows that the spiral valve must suffer serious mutilation.

Fortunately, the lines of attachment of the spiral valve are approximately indicated at the surface of the intestine by branches of the anterior mesenteric artery. This anatomical arrangement makes it possible to remove portions of the intestinal wall without danger of damage to the spiral valve. There follows a brief description of one method of dissection which has proved quite satisfactory.

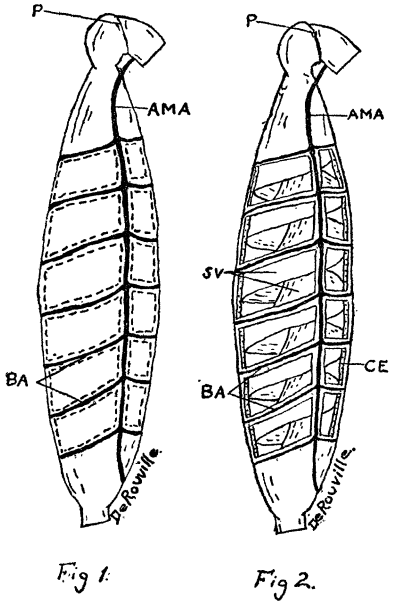

Fig 1. Fig 2.

AMA, anterior mesenteric artery; BA, branch arteries; CE, cut edge of the spiral valve; SV, spiral valve; P, pylorus.

Fig. 1 shows an undissected intestine with broken lines outlining portions of the intestinal wall to be excised. Fig. 2 shows the appearance of the intestine after dissection. By this method of dissection the intestinal wall is reduced to a mere skeletal support for the spiral valve which is left intact and sufficiently exposed so that its structure can be easily studied.

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SPECIAL ARTICLES

X-RAYS AND MUTATIONS

ONE of the paragraphs in the article entitled "Biological Effects of X-rays," by H. K. Svenson in SCIENCE 69: 361, March 29, 1929, may lead to a misunderstanding of the experiments to which reference is made. The results of the experiments were published jointly by the present writer and H. K. Svenson in three papers: "An Effect of X-rays on the Linkage of Mendelian Characters in the Second Chromosome of *Drosophila Melanogaster*,"[1] "Crossing over in the Second Chromosome of *Drosophila Melanogaster* in the F_1 Generation of X-rayed Females"[2] and "A Comparison of the Effects of X-Rays and Temperature on Linkage and Fertility in *Drosophila*."[3] The aims of the experiments are correctly expressed in the above titles of the papers describing them. Mutations were, of course, not to be ignored if they were found; on the other hand the experiments were not planned with a view to testing the possiblity of producing mutations by X-ray treatment. Nor were the experiments as carried out particularly favorable to the discovery of mutations.

Records of the four experiments referred to are given in two papers.[1, 3] In these experiments the female parent only was X-rayed, and the experiments were followed only to the F_1. In these F_1 only one, that from the mother, of any two homologous genes could have been exposed to X-rays except in the rare cases of non-disjunction. A recessive mutation if produced by the X-rays could, therefore, be observed only in the males and then only if it occurred in the X-chromosome. Dominant mutations, although on the whole rarer than recessive mutations, could be observed in either the male or the female F_1. The records of the experiments given in the papers referred to showed that there was observed a total of 49,360 F_1 males, of which 20,069 were the offspring of X-rayed mothers; of these 20,069 males, 5,513 came

[1] *Genetics*, 9:70–89. 1923.
[2] *American Naturalist*, 58: 311–315. 1924.
[3] *Genetics*, 9: 588–608. 1924.