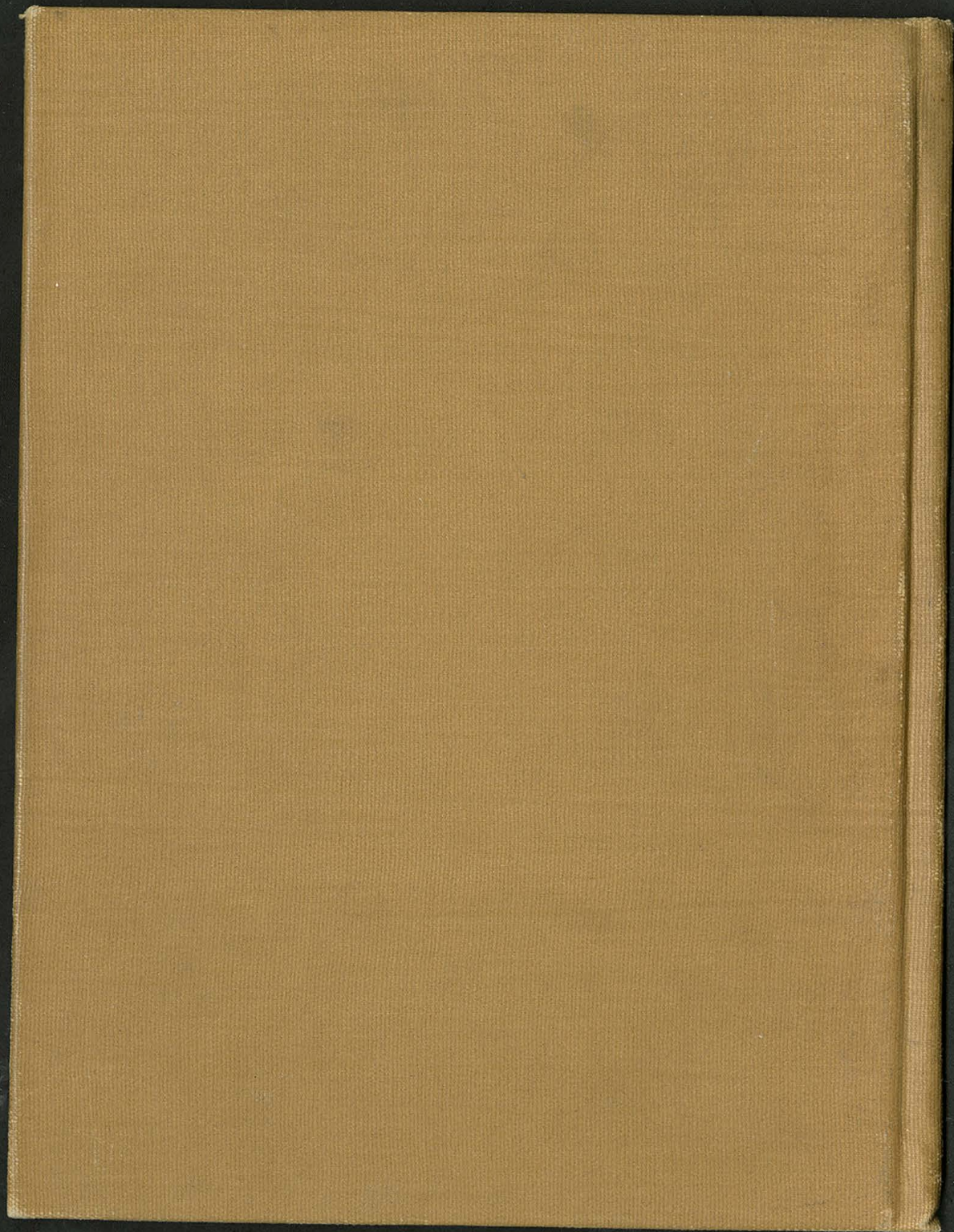


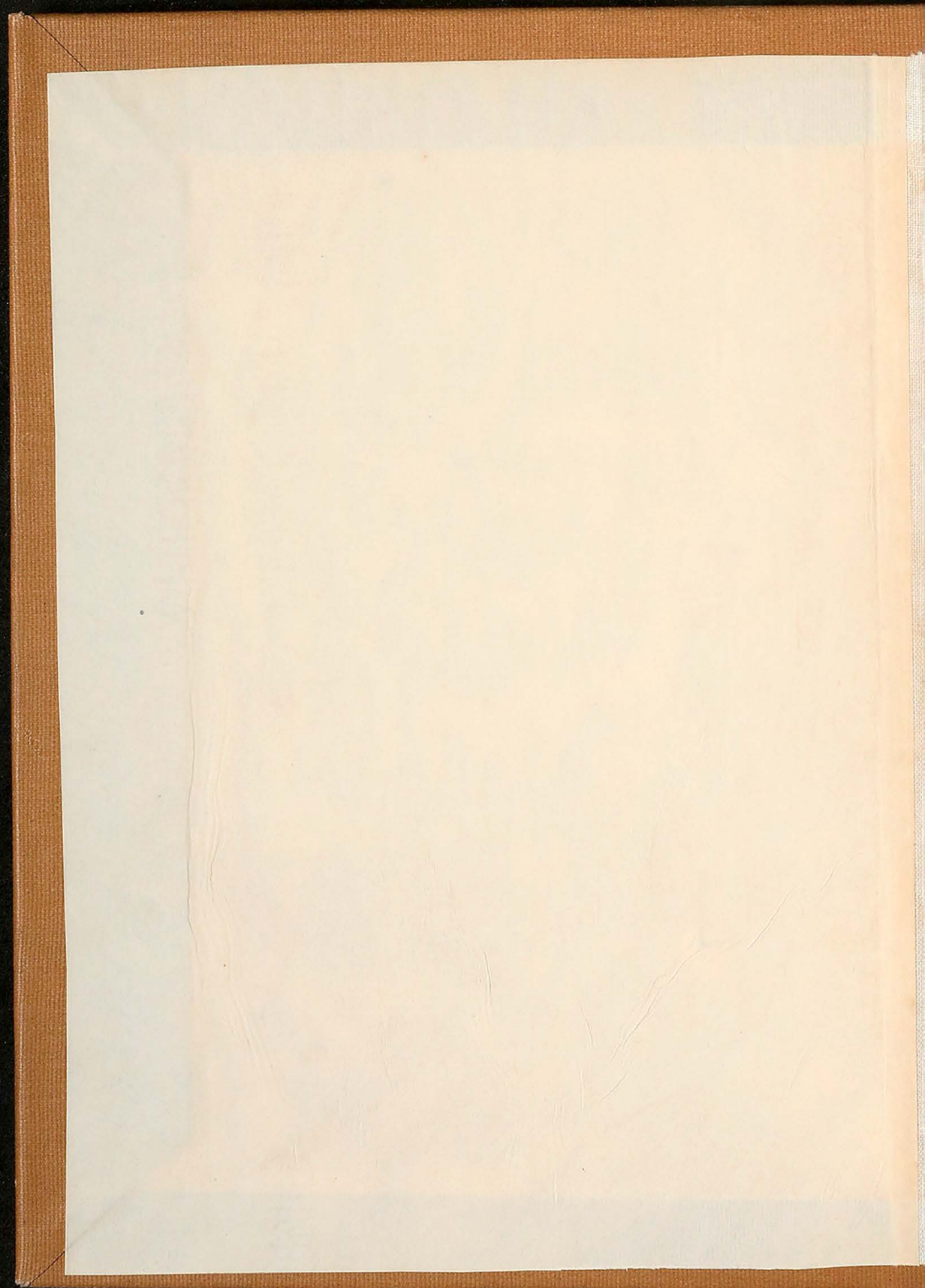
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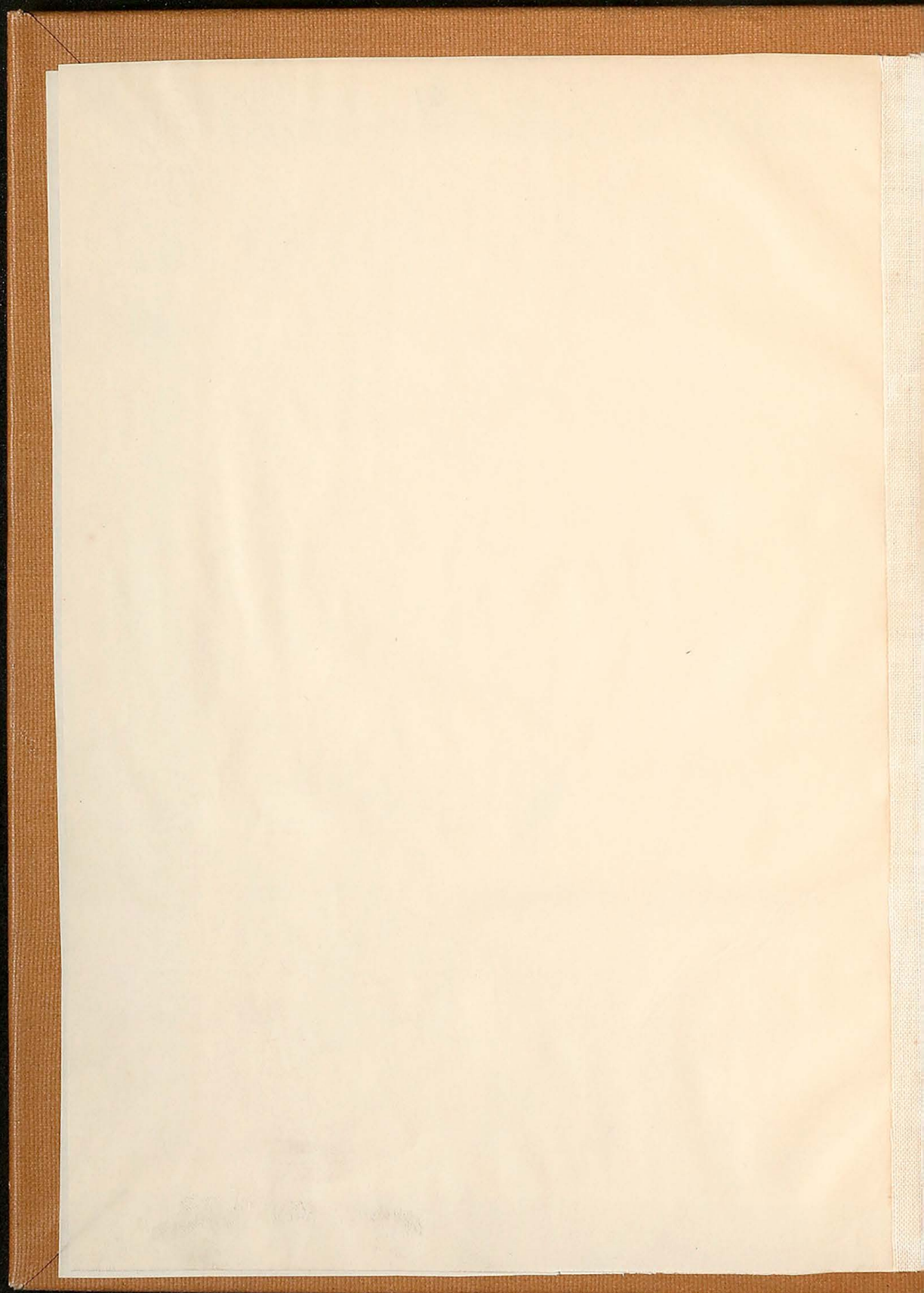


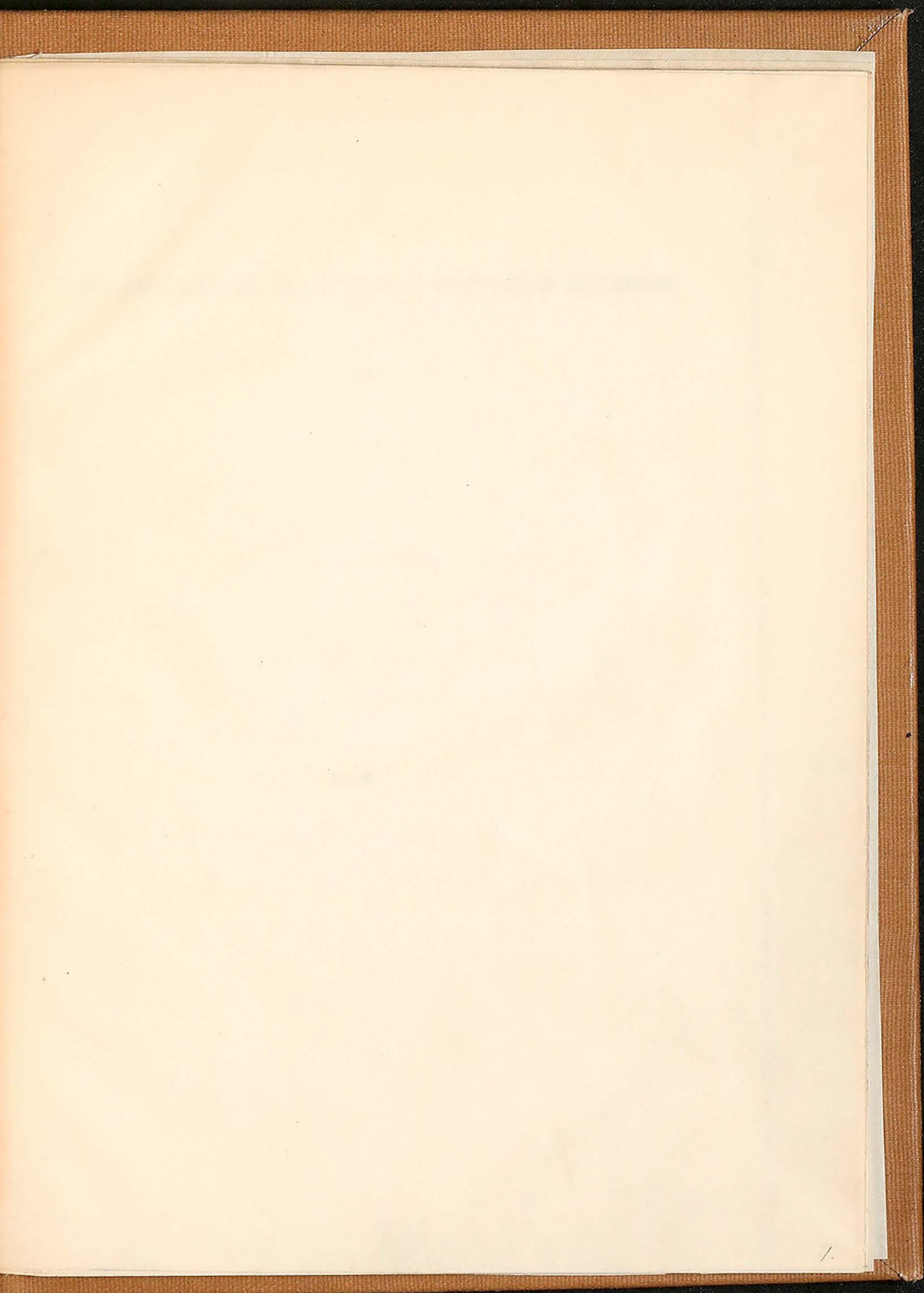
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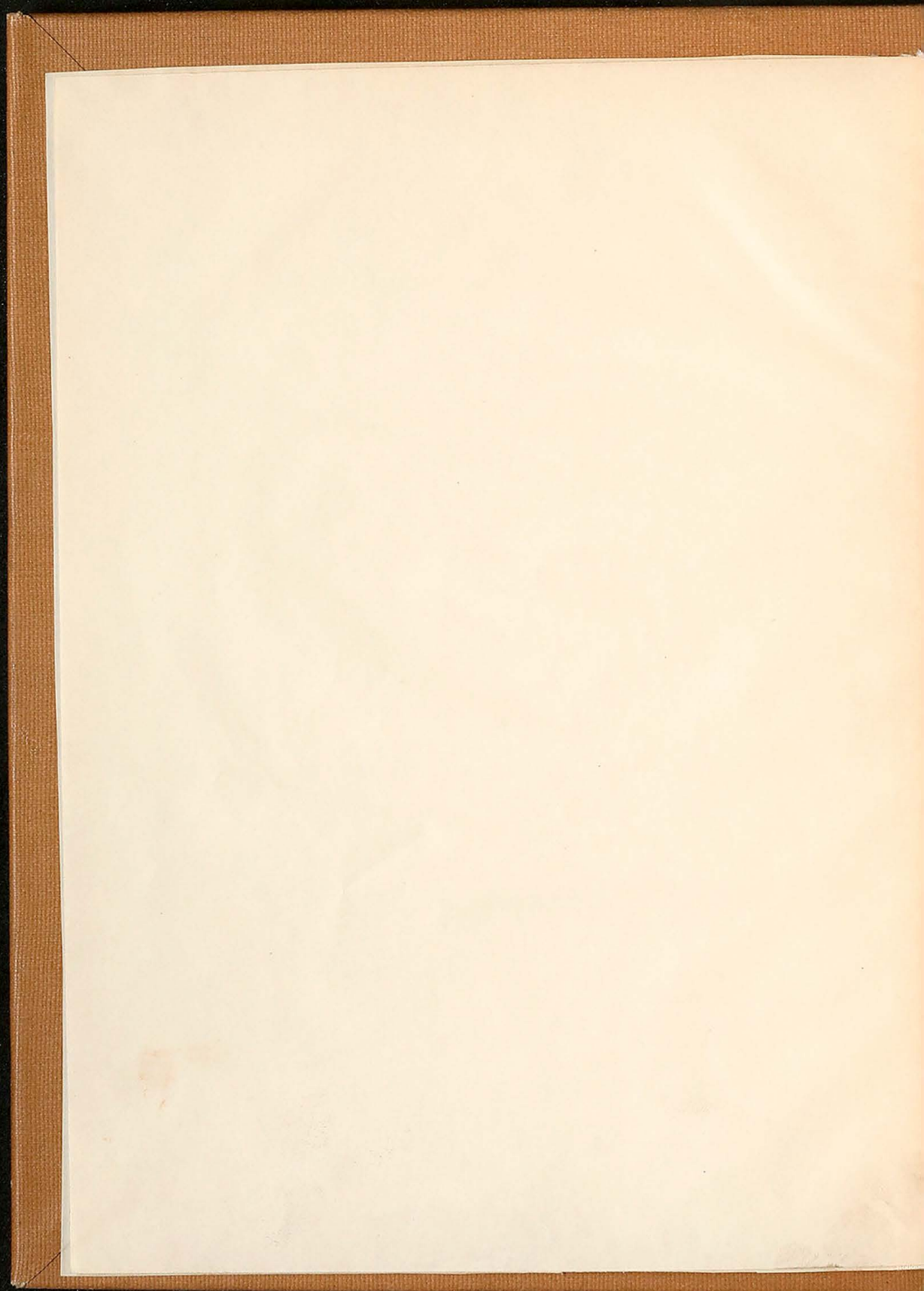
THE HISTOLOGY OF THE ENTERON
OF PROTHYNGHUS APPLANATUS
BY
LORIN F. GUY











THE HISTOLOGY OF THE ENTERON OF PROREYNCEUS APPLANATUS

By

Loren P. Guy

1924

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THE HISTOLOGY OF THE ENTERON OF PRORHYNCHUS APPLANATUS

By

Loren Fritchard Guy

A thesis presented to the Academic Faculty of the
University of Virginia in candidacy for the degree
of Master of Science.

1924

THE HISTORY OF THE STATE OF NEW YORK

BY
J. B. ALLEN
Author of "The History of the State of New York"
and "The History of the State of New York"

A Series of Essays
on the History of the State of New York
from the First Settlement to the Present Time
by J. B. Allen

1844

The Histology of the Enteron of *Frerhynchus Applanatus*

Frerhynchus applanatus is found on submerged leaves and grass in the ponds in the vicinity of the University of Virginia. The Golf Course Pond at the University is where the specimens for my observations were collected.

Good results in fixing *Frerhynchus applanatus* were obtained by using hot aceto-sublimate. Dehydration must be done with care. After the specimen has been in the fixing fluid ten minutes wash three times in water. Then draw off all the water and add ten drops more. Every two minutes add two drops of 95% alcohol to the water until twenty drops have been added. Draw off ten drops of this mixture and add two drops of the alcohol every two minutes until twenty more drops have been added. Draw off ten more drops of the mixture and add twenty more drops a third time. Then pour off all the mixture and add pure 95% alcohol. To this add two drops of 100% alcohol every two minutes until twenty drops have been added. Draw off and add ten drops of 100% alcohol. Change from alcohol to xyline by the same process as was gone thru with the alcohol.

The History of the Bureau of Investigation

The Bureau of Investigation is one of the most important departments of the United States Government. It is the only department of the Government which is not a part of any other department. It is the only department of the Government which is not a part of any other department. It is the only department of the Government which is not a part of any other department.

Good results in this department are obtained by using the following principles: 1. The first principle is to have a clear and definite purpose in mind. 2. The second principle is to have a plan of action. 3. The third principle is to have a system of organization. 4. The fourth principle is to have a system of control. 5. The fifth principle is to have a system of record-keeping. 6. The sixth principle is to have a system of communication. 7. The seventh principle is to have a system of cooperation. 8. The eighth principle is to have a system of evaluation. 9. The ninth principle is to have a system of improvement. 10. The tenth principle is to have a system of maintenance.

Use two changes of paraffin for five minutes each and then embed.

The section should be cut 7μ thick. Stain in iron hematoxylin. Beautiful slides showing the cells in several colors may be made by using Mallory's triple connective tissue stain as follows:

Solution I.

Acid fuchsin.....0.5 grams.
Distilled water.....100 c.c.

Solution II.

Anilin blue.....0.5 grams.
Orange G.....2.0 grams.
Phosphomolybdic acid, 1%
aqueous solution.....100 C.C.

Stain in Solution I for five minutes and transfer to Solution II for fifteen minutes. Wash and dehydrate in several changes of 95% alcohol and then pass into 100% alcohol. Clear paraffin with xylene and mount with damar or balsam.

This method will show the two types of cells I wish to demonstrate; the secreting type and the epithelial type which will be orange and blue, respectively.

Prorhynchus applanatus is classified under Rhabdocoeles. Rhabdocoeles are closely related to the fresh water polyps, in fact, the relationship between the two groups is of the closest order. In view of this relationship a comparison of the

endodermal histology of the groups will be appropriate.

The Turbellaria, under which the Rhabdocoeles are classed, get their name because of the tiny currents in the water created by the delicate cilia which cover the body. The Turbellaria are either cylindrical, thread-like, spindle-shaped, or more or less flattened and leaf-like. They range in length from a fraction of a millimeter to several centimeters. The larger forms are usually inconspicuously colored, gray, brown, or blackish, or entirely free from pigment. The smaller forms are often brilliantly colored, yellow, orange, red, or rose. A few appear green due to zoochlorellae within the mesenchyma. *Frerhynchus applanatus* is white.

The anterior end of these animals is often modified to suggest the form of a head, either by the presence of the various sense organs, a pair of lobes or cephalic appendages, or by a groove separating it from the rest of the body. Eyes may or may not be present. If present the number is usually two, tho some forms have four or more.

A pair of sensory pits occurs in the anterior region in many forms. These may be oblong, round, or slit-shape. They are connected with special brain ganglia, are usually provided with long cilia, and are regarded as olfactory organs. A few forms possess a statocyst. The epidermis consists of single layer of ciliated cells. In addition to the cilia, remark-

embryonal histology of the embryo will be

appreciated.

The trophoblastic, which is the chorionic

are cleared, and their main purpose of the

currents in the water created by the embryo cells

which cover the body. The trophoblastic are often

cylindrical, spindle-like, spindle-shaped, or

more or less flattened and leaf-like. They range in

length from a fraction of a millimeter to several

centimeters. The larger forms are usually broad-

lymphatic vessels, nerves, or blood, or

entirely free from ligaments. The smaller forms are

often partially covered, folded, or

free. A few appear to be in the form of

the mesoderm. In some cases they are in

the interior and of these cells in

which to suggest the form of a head, which by

the presence of the various bones, a pair

of lobes or cardiac appendages, or by a series

separating it from the rest of the body. They may

or may not be present. If present the number is

usually two, the same form have been

a pair of sensory cells in the

region in many forms. These may be

or all-charge. They are connected with special

organs, and usually provided with long

are regarded as different organs. A few forms

a structure. The structure consists of single

of related cells. In addition to the

ably long sensory hairs are present in a few forms. The Turbellaria are richly supplied with various kinds of glands such as slime glands.

In Rhabdocoels the mouth may be placed at the anterior end or at various points on the ventral surface. The pharynx is represented by three general types; simple, bulbous, and plicate. The intestine has the form of a simple sac; it consists of a blind cylindrical tube, median in length of the animal. It is sometimes provided with short lateral diverticula.

The Turbellaria differ from the polyps like hydra in that they are triploblastic whereas the polyps are diploblastic. Another distinguishing feature is the lack of an associated pharynx in the enteron of the polyps.

The alimentary canal of *Frerhynchus applanatus* consists of a mouth, a very muscular pharynx which may be shot in and out, and an enteron extending anteriorly under the pharynx and possessing numerous slender very closely set diverticula. The length of the body is about 4mm. It is white and is dorso-ventrally flattened.

In the enteron of the hydra three types of cells are distinguishable. Around the lips of the enteron is found a type which may be the counter-part of the pharyngeal cells of *Frerhynchus applanatus*. Scattered at random in the enteron are found the second type of cells which are secreting cells. The third type is the

This long narrow body is present in a few cases.
The tubulars are slightly enlarged with various
kinds of glands and other glands.

In tubulars the body is present at the
anterior end and at various points in the ventral
surface. The tubulars are represented by three narrow
spiral, oblique, hollow, and slightly flattened
has the form of a single row; it consists of a single
cylindrical tube, which is larger at the anterior end.
In tubulars provided with short lateral processes.
The tubulars differ from the poly-
in that they are tubular in the narrow part and
cylindrical. Another characteristic feature is the
lack of an associated narrow part in the anterior part of the
poly-.

The tubulars consist of two separate segments
consisting of a small, a very narrow, and a large
may be that in one end, and an anterior extending
anteriorly under the body and posteriorly extending
slender very slightly and divergent. The length of
the body is about 100. It is white and is slightly
ventrally flattened.

In the center of the body there is a small
and cylindrical, having the form of the anterior
is found a type which may be the anterior end of the
physiological cells of tubulars and segments. Tubulars
of tubulars in the anterior end have the second type of
cells which are associated cells. The third type is the

epithelio-muscular cells, which are seen to contain food vacuoles, chyle, and bear muscular processes.

The enteron of *Prorhynchus applanatus* contains two types of cells, the epithelial cells and the secreting cells. The epithelial cells are oblongly-shaped, are 25μ in length and are 5μ wide. They contain numerous food vacuoles especially in the portion nearer to the enteron cavity. The nucleus of each is about 2μ wide and 4μ long. They are also long-shaped. These cells are quite uniform. Unlike the epithelium cells of the hydra they have no muscular processes. This is due no doubt to the presence of an intervening layer of cells, the mesoderm in *Prorhynchus applanatus*. The secreting cells are also oblong but a bit larger than the epithelium cells. They average about 30μ in length and 12μ in width. The nucleus is found in the portion near to the mesoderm.

In the hydra these secreting cells are distributed at random thru out the enteron. In all the Turbellaria besides *Prorhynchus applanatus* they are also scattered at random. But in *Prorhynchus applanatus* they are found at the most lateral portion of the diverticula in the enteron. A study of the accompanying diagrams will demonstrate this fact.

epithelial-muscular cells, which are seen to contain
food vacuoles, etc., and have numerous processes.

The nature of the epithelial-muscular cells is

two types of cells, the epithelial cells and the

muscular cells. The epithelial cells are elongated

shaped, and are 1/2 to 1/4 mm. long.

These cells have numerous food vacuoles especially in the

central part of the cell. The muscular cells are

of such a size that they are 1/2 to 1/4 mm. long and are

long-shaped. These cells are also elongated.

The epithelial cells of the body have no

muscular processes. This is due to the fact that

presence of an intervening layer of cells, the

muscular cells, is present between the epithelial cells

and also the fact that the epithelial cells are

cells. They average about 1/2 to 1/4 mm. long and 1/4 to 1/2

mm. wide. The nature of the cells is due to the nature

of the cells which are present in the body.

It is the nature of the cells which are present in the

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body which are present in the body.

In view of this *Prorhynchus applanatus* is more highly specialized than other Turbellaria and in this respect it is more removed from the ancestral polyp-like ancestor.

Summary.

1. *Prorhynchus applanatus* has two types of cells in its enteron: general epithelial cells and secreting cells.
2. The general cells are uniformly distributed in the enteron. The secreting cells are, however, segregated occupying the most lateral portions of the diverticula.
3. This regular distribution is unique with *Prorhynchus applanatus*.

In view of the fact that the
more light is admitted the more
and in this regard it is necessary to
consider the following:

1. The first condition is that the
cells in the interior should be
and covering cells.
2. The second condition is that the
in the interior, the covering cells are
necessary to keep the cells from
the distribution.
3. The third condition is that the
distribution of the cells

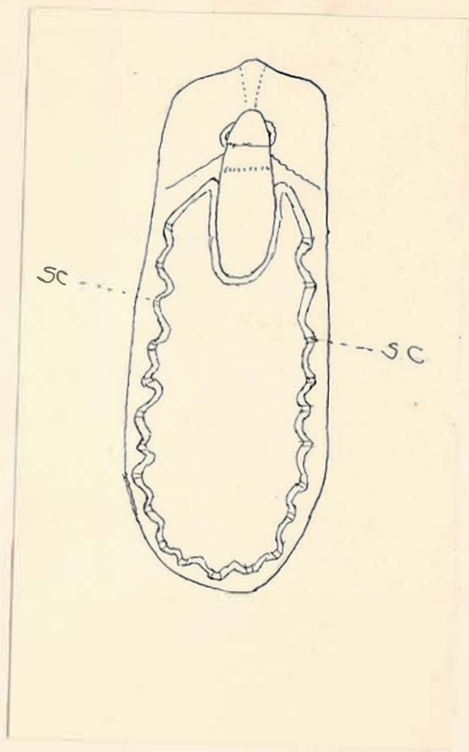


Diagram showing position of secreting cells in the enteron of *Prorhynchus Applanatus*.

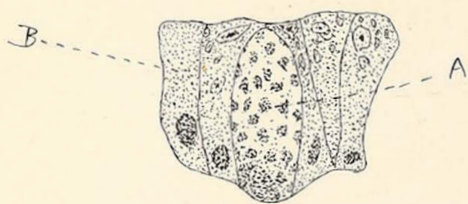
S C. Secreting cells.

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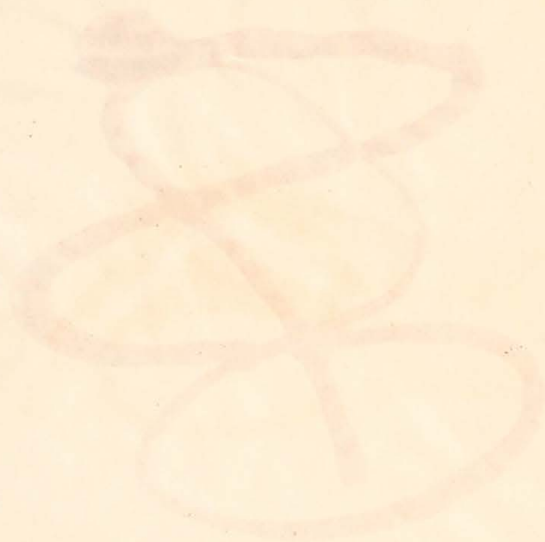
Two Types of Cells in the Enteron of

Prorhynchus Applanatus.

A. Secreting cell.

B. General epithelial cell.

X 1000



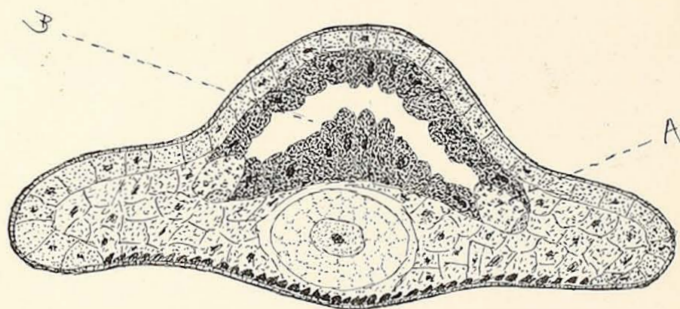
The first of these is the subject of

the following experiment.

A. The first of these is the subject of

the following experiment.

1. 000



Cross-section Diagram of Frorhynchus Applanatus

- A. Secreting cell.
- B. General epithelial cell.

x 333

1. *Staphylinus*

2. *Staphylinus*

3. *Staphylinus*

4. *Staphylinus*

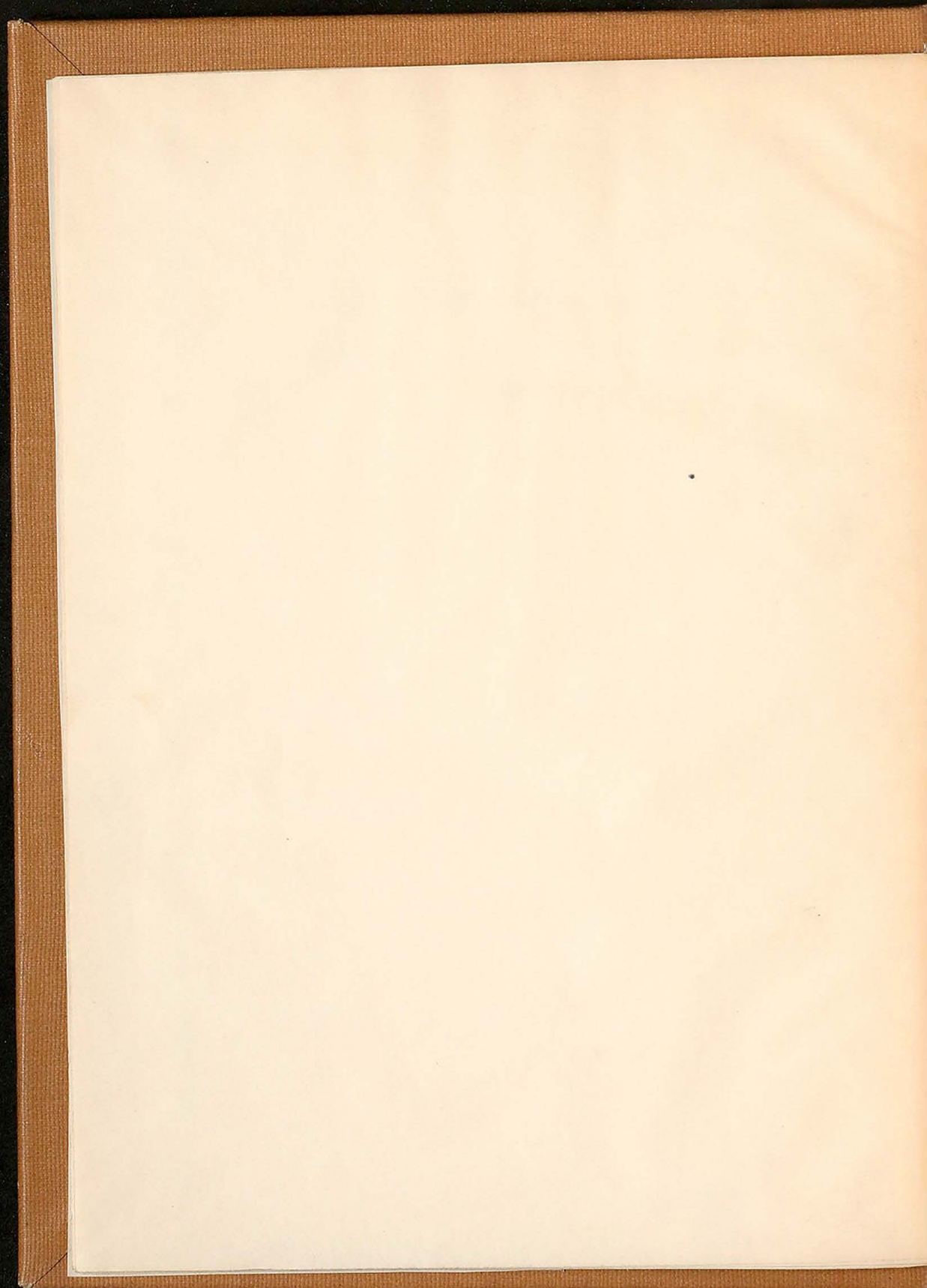
5. *Staphylinus*

6. *Staphylinus*

Literature

Graff, L. von, 1882. Monographie der Turbellarien.

Weed, Henry B. and Whipple, George C. 1918. Fresh-
Water Biology.



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