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growth when conditions become more favorable. In some cases the dry plants
are so inconspicuous that it is almost impossible to detect them. In discussing
the hepatic flora of western California, Campbell\(^6\) calls attention to many inter-
esting peculiarities of xerophilous species, and his remarks would apply equally
well to the hepatic flora of Arizona.

The state of Arizona is bounded by Mexico, California, Nevada, Utah,
and New Mexico, while its northeastern corner meets the southwestern corner
of Colorado. The Hepaticae of Nevada and Utah are almost unknown, so that
it is impossible to make profitable comparison between the hepatic floras of these
states and that of Arizona. The Hepaticae of California, however, are known
to us through the thorough and comprehensive work of Howe,\(^7\) who recognizes
eighty-six species, inclusive of the Anthocerotes. For Colorado the writer\(^8\) has
listed forty-one species, while Standley\(^9\) has reported twelve species from New
Mexico. The Hepaticae of Mexico were long ago described by Gottsche,\(^10\) and
only scattered references to them have since been published. Perhaps four
hundred species would be a conservative estimate for the entire country. Of
the twenty-one species listed from Arizona, fifteen have been recorded from
California, nine from Colorado, five from New Mexico, and twelve from Mexico.
These figures would indicate a close relationship between the species of Arizona
and those of California and Mexico. The number of Arizona species known
from New Mexico is surprisingly small and would probably be increased by
careful exploration. A closer relationship between the species of these two
states is certainly to be expected.

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SOME EXPERIMENTS ON THE GERMINATION OF MOSS SPORES ON
AGAR

DAISY J. LEVY

In November, 1915, I collected *Pogonatum brevicaule*. This moss is quite
common on freshly turned clay banks. It is characterized by a persistent pro-
tenema, the leaves being few and short. It fruits in the autumn.

The material was kept in clay dishes in the greenhouse of Columbia Univer-
sity. In April, I sowed spores of these plants in petrie dishes in which I had
prepared a Bejerink agar culture.

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\(^6\) Torreya \textbf{4}: 81-86. 1904.


\(^8\) Preliminary list of Colorado Hepaticae. \textit{Bryologist} \textbf{18}: 44-47. 1915.

\(^9\) Hepaticae of New Mexico. \textit{Bryologist} \textbf{18}: 81-83. 1915. Additional notes upon New
Mexican Hepaticae. \textit{Bryologist} \textbf{19}: 64, 65. 1916.

Distilled water.......................... 500 cc.
Ammonium nitrate.......................... 25 gr.
Potassium phosphate........................ 1 "
Magnesium sulphate........................ 1 "
Calcium chloride........................... 0.05 "
Dextrose.................................... 0.005 "
Trace of ferrous sulphate
Agar.......................................... 7 gms.

The cultures were placed under bell jars in a north window and were examined almost daily. The spores continued to look green and healthy. After a few days, probably through faulty sterilization or because of the dextrose, bacteria destroyed six out of ten plates. About four weeks later, the spores in the good plates showed signs of swelling which is the first indication of spore germination. This was followed by a hyaline appearance at one end of the spore which became egg-shaped because of the protruding germ tube through the ruptured spore coat.

Protenemal growth took place rapidly, the protenema being filamentous alga-like in appearance. Transverse cross walls were cut off, the plate soon becoming filled with this branching growth. In none of my cultures did I observe any oblique septa, which are indicative of rhizoid formation. The growth was entirely apical, the lateral branches being formed behind septa.

The buds were formed on the lateral branches. Walls intersecting each other cut off portions of the ends of the filaments until a pear-shaped structure resulted with cell division in three dimensions. From these buds the leafy branch will originate.

I made sections and then triple-stained portions of the cultures in order to preserve the facts stated above:
1. Spores before germination.
2. Spores in the egg-shaped stage, showing the hyaline spot.
3. Germ tube in the one- and two-celled stage.
4. Buds in several stages.

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HABITAT OF CEPHALOZIA FRANCISCII ON LONG ISLAND, N. Y.

Roy Latham

Fifteen miles west from the eastern extremity of the north prong of Long Island is located Horton's Point, just north of the village of Southold. This is a sandy beach, one to two hundred yards in latitude, extending two miles along the coast of Long Island Sound. Inclosed on east and south by wooded hills and shifting sand-dunes, on the west cut off by an inlet from the Sound.

For a short distance back from the flood tide margin the beach is high and dry and vegetated with Cladonia rangiferina, Panicum amarum, Prunus maritima, Hudsonia tomentosa, Crysopsis, and clumps of shrub oak, Quercus stellata.