THE SIMILARITY EXISTING BETWEEN SOME ALGAE AND
SOME POLLENS WITH A FURTHER NOTE CONCERNING
PHYTOMORULA REGULARIS KOFOID

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Herbert F. Copeland (1937) pointed out the similarities existing between
certain Mimosoideae pollen and Kofoid's algal genus Phytomorula. This paper,
in Madroño, appears not to have had the wide circulation among algologists which
it deserved.

To anyone who has seen pollen from such species of Acacia as A. longifolia,
A. baileyana, or A. verticilata, there can be no doubt as to the accuracy of Copeland's conclusions. A discrepancy which he mentions, however, does exist between
the two published figures of Phytomorula. That by Kofoid (1914) shows a small
dome-like protuberance on each cell, while Smith's figure (1933) shows a larger,
broad protuberance. Copeland was not able to explain this discrepancy, although
he suspected that the shape of the protuberance was dependent upon the degree
of exposure to which the pollen cluster had been subjected. The present work
appears to verify these suspicions.

The writer, in organizing a reference collection of pollen in connection with a
study of fossil and subfossil algae of Ohio Bogs, noted the similarities as well as
the discrepancies existing between Acacia pollens and the figures of Phytomorula.
In an attempt to find a suitable method of preparing pollens for study, the reasons
for these differences became evident. A pollen cluster of Acacia when taken
directly from the flower and shown in Fig. 1c, shows the broad protuberance on
the outer face of each cell. When such a cluster is treated with various mounting
media, a distinct shrinkage is evident, resulting in small dome-like protuberances
as figured by Kofoid, Fig. 1a. If the shrinkage is controlled by varying the con-
centration of the media, clusters will be found in which some of the cells show the
small dome-like protuberance, while others exhibit no sign of shrinkage, Fig. 1b.
Figure 1d is a copy of Smith's figure of Phytomorula.

Such differences in the contour of cells of Acacia pollen clusters therefore
appear to be due to varying periods of exposure before collection. The discovery
of the true nature of Phytomorula by Copeland is an excellent example of the
implications which may be evident to the algologist and non-algologist alike.

With the recent advance in the study of fossil pollen and fossil algae in peat
deposits, the need for a reciprocal knowledge of their respective fields by the
pollen analyst and algologist is evident. As both pollen and algae occur inter-
spersed in the same deposits, it is sometimes very difficult to identify them with
any degree of certainty unless they or their near relatives have been previously
encountered in living condition.

The foregoing example is merely a case where the algologist was led into com-
mitting an error because of a lack of information concerning pollen structure.
If we look at the other side of the fence, we find possibilities of pollen workers
committing the same kind of errors. If there is so great a resemblance in one
direction, then there may be a possibility of the situation being reversed. In
substantiation of this, there is a genus of the unicellular algae, Trochiscia, the
species of which are identified entirely on wall characters. Species having reticulate,
spiny, or otherwise sculptured walls might easily be mistaken for pollens. Also that certain pollens might be assigned to this genus by the inexperienced algologist. Another error, and one which I feel may have been committed in some instances, is the identification of the cysts of certain species of *Trachelomonas* as grass pollens. This genus, a relative of *Euglena*, is characterized by having the individual surrounded by a silicious cyst with one pore. A study of the cyst, however, will readily distinguish it from pollens.

In order to eliminate the possibility of error, the algologist, and especially the one interested in fossil algae, should familiarize himself with as many pollens as possible. Likewise, the pollen analyst should be familiar at least with the various classes of algae.

**LITERATURE CITED**

