

began at the tip and progressed downward, and in the first years of observation this advance was very evident during the period of blooming. However, in certain "full-flowers" some of the segments near the center of the flower showed an advanced stage of chlorophyll formation even before its completion in the outer divisions. In these flowers the trumpet was entirely absent.

A few other specimens possessed flowers of an unusual form. One of these bore a general resemblance to *Narcissus incomparabilis*. The leaves were slightly more pointed but the chief points of difference were in the flowers. The flowers were nearly erect and large with rather pointed segments. One of the chief differences was noticeable in the corona. This equaled the segments in length and was broadly barrel-shaped. The outer end of the corona instead of flaring out, was strongly constricted and showed a fringe-like border of very narrow divisions. The color of the corona was deep yellow except the fringe-like border which was of a very light yellow color. The stamens and style were included as in the common *N. incomparabilis*. Only a few flowers showed the above mentioned differences and were growing among a large number of other specimens all of which were *N. incomparabilis*. For this reason the deviations above mentioned were all the more noticeable, and therefore stood out with surprising distinctness in comparison to the hundreds of uniformly shaped flowers of *N. incomparabilis* which immediately surrounded them. A dense bed of *N. poeticus* in which an actual count showed more than 4,000 flowers, which were fully open at the same time, showed only a slight tendency in two of the flowers to deviate from the normal. These two specimens suggested slightly the form assumed by *N. poeticus* var. *plenus*. Of all the forms of *Narcissus* which I have grown and kept under observation during the last ten year, *N. poeticus* has retained the original type form most perfectly.

DEPOSITION OF MATERIAL BY WATER PLANTS.

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It is a matter of common knowledge that various organisms, such as plants, play an important rôle in the deposition of material in bodies of rather still water, as for example, lakes and ponds. This takes place to a very noticeable degree in many ponds having a heavy growth of vegetation in the water, and into which very little soil is carried by erosion. When, however, plant activity, as here referred to, is supplemented by erosive action of the surrounding land, complete obliteration of considerable bodies of water, such as shallow ponds, may occur in a comparatively short time. This has been observed by the writer to progress rather rapidly in the case of some shallow ponds. About some ponds and lakes erosion is not an important factor in this respect as was found by Evermann and Clark for Lake Maxinkuckee. Birge and Juday have estimated the organic matter in Lake Monona. Some deposition,

however, of soil and other materials in lakes and ponds inevitably takes place. The exact amount of material, therefore, deposited by plants is in such cases an uncertain quantity. However, the writer has been studying the problem for some years by means of experiments where water plants only were involved. The experiment was performed as follows: Jars having a capacity of about four liters were filled to a depth of three cm. with cleanly washed sand on top of which was placed washed gravel. Other jars of equal capacity were used in which no sand or gravel was placed. All six of the jars so arranged, which included three of each kind, were filled with tap water. Five sprays of *Elodea* each ten cm. long were placed in each jar, and an equal number of *Chara* plants. The loss of evaporation was replaced by occasional additions of tap water. The *Elodea* grew rapidly at first and finally practically filled the jars. By the end of six months the *Elodea* was, for the most part, displaced by the *Chara* plants and various algae which had appeared, especially *Gloeocapsa*. When the experiment was one year old every vestige of *Elodea* had been crowded out and the *Chara* was reduced about one-half of its former amount, as it, like the *Elodea*, was unable to withstand the competition with the rapidly increasing *Gloeocapsa*. Meanwhile, heavy deposition of material from the dead plants had taken place and had assumed a depth of one-half cm. by the end of the first year over the bottom of the jars. Since the sand and gravel layers, above mentioned, interfered with a quantitative estimation of the amount of deposited material, those jars containing such substances were discontinued after the first year. Only those jars having no floor of sand and gravel were observed after the first year till the completion of these observations. By the end of the second year not more than one-fourth of the *Chara* was growing in the jars, but other forms, especially *Gloeocapsa*, had greatly increased. The deposition of material averaged 12 mm. in depth on the bottom of the jars by the end of the second year. The first year's deposit had meanwhile become denser. During the third year the deposited material increased to a depth of four cm. and with a further increase in density of the first two year's deposition. During the third year a further decline in activity and amount of the *Chara* was noticeable and a decided increase in the algae forms was evident. The fourth year marked an increase of two and one-half cm. of deposited material but still a considerable growth of *Chara* was present. The fifth year showed only a small amount of *Chara* present, but a large increase of algae forms and a loose deposition of three cm. of material. The algae, dense as it was, could not displace the *Chara* and this has been an observation in large pools and tanks out of doors.

Hence many of the larger forms of water plants may be readily crowded out or reduced to a minimum by various algae growths. The algae may be easily destroyed by the method of Moore and Kellerman. During the second and third years a very dense growth of *Polyridium cruentum* occurred but this alga was not present in any other year's growth. The various forms of algae and deposited material varied considerably in thickness in different parts of the jar. While these depositions at first were very loosely deposited and were unusually

thick, as above stated, in the year formed, the layers of each year became finally very compact and were only a fraction of the original thickness. Of all the forms of plants present, *Gloeocapsa* was by far the most numerous and was of greatest volume. The algae found during the several years above referred to in the jars, numbered 32 species. Not all were, by any means, present at one time; but they came and went according to the general conditions of growth. Quite a number could be found at any one time. Of the forms observed, *Pediastrum* was the least numerous and was found only during the first weeks of the observation. The resistance of *Chara* to a dense growth of other forms was well shown in this experiment. As was the case with *Elodea* nearly every other species of higher forms would have been crowded out under the conditions here described and in a comparatively short time.

A STUDY OF LICHENS.

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It is frequently of interest to ascertain why plants are living in certain places and how they maintain their existence in definite areas. On the other hand it is equally valuable to ascertain, when they disappear wholly or partly, what forms vanish first, what ones partly and what ones remain. It has long been known that one striking fact concerning lichens is the apparent ease with which they are crowded out by civilization. At the end of the following list of lichens of Monroe County, these points will be briefly indicated.

Peltigera canina, *P. rufescens*, *P. horizontalis*, *Lecidea melancheima*, *Gyrophora mühlenbergii*, *Graphis scripta*, *Collema pulposum*, *Leptogium scotinum*, *Teloschistes polycarpus*, *T. lychnus*, *T. concolor*, *Umbilicaria pustulata*, *Amphiloma lanuginosum*, *Thamnomia vermicularis*, *Acarospora chlorophana*, *Trypethelium virens*, *Verrucaria rupestris*, *Pertusaria communis*, *P. vellata*, *P. Leioplaca*, *Endocarpon minutum*, *Leptogium tremelloides*, *Hydrothyria venosa*, *Nephroma helvetica*, *Lopadium periroideum*, *Pannaria leucosticta*, *P. lurida*, *Coniocybe pallida*, *Psora Russellii*, *Xylographa parallela*, *Arthonia radiata*, *Arthothelium spectabile*, *Rinodina sophodes*, *Placodium elegans*, *P. cinnabarrinum*, *Urceolaria scruposa*, *Lecanora Hageni*, *L. muralis*, *L. subfusca*, *L. pallida*, *Cladonia rangiferina*, *C. cristatella*, *C. pyxidata*, *C. verticillata*, *C. fimbriata*, *C. sylvatica*, *C. bacillaris*, *Usnea barbata*, *Physcia stellaris*, *P. speciosa*, *P. pulverulenta*, *P. tribacia*, *Parmelia perlata*, *P. rudecta*, *P. perforata*, *P. physodes*, *P. caperata*, *P. borreri*, *Sticta amplissima*.

A few specimens of *Collema* were partly displaced by *Mucor* in very damp situations and this sometimes occurs when this form is kept very moist for some time in the laboratory. As is known dust is very destructive; hence many forms have vanished along dusty roads and streets. The great power of some forms to resist desiccation has been