Petone garden of A. D. Beddie. It produced no flowers with the juvenile foliage, and on twigs with intermediate foliage there were flowers but no fruit sets. There is no longer any juvenile foliage on it. It is suggested that the bleak weather conditions at Palliser Bay may have helped to stimulate precocious fruiting, whereas in the sheltered Petone garden growth was more normal.

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# Notes on Some Cladonias of Otago and Southland

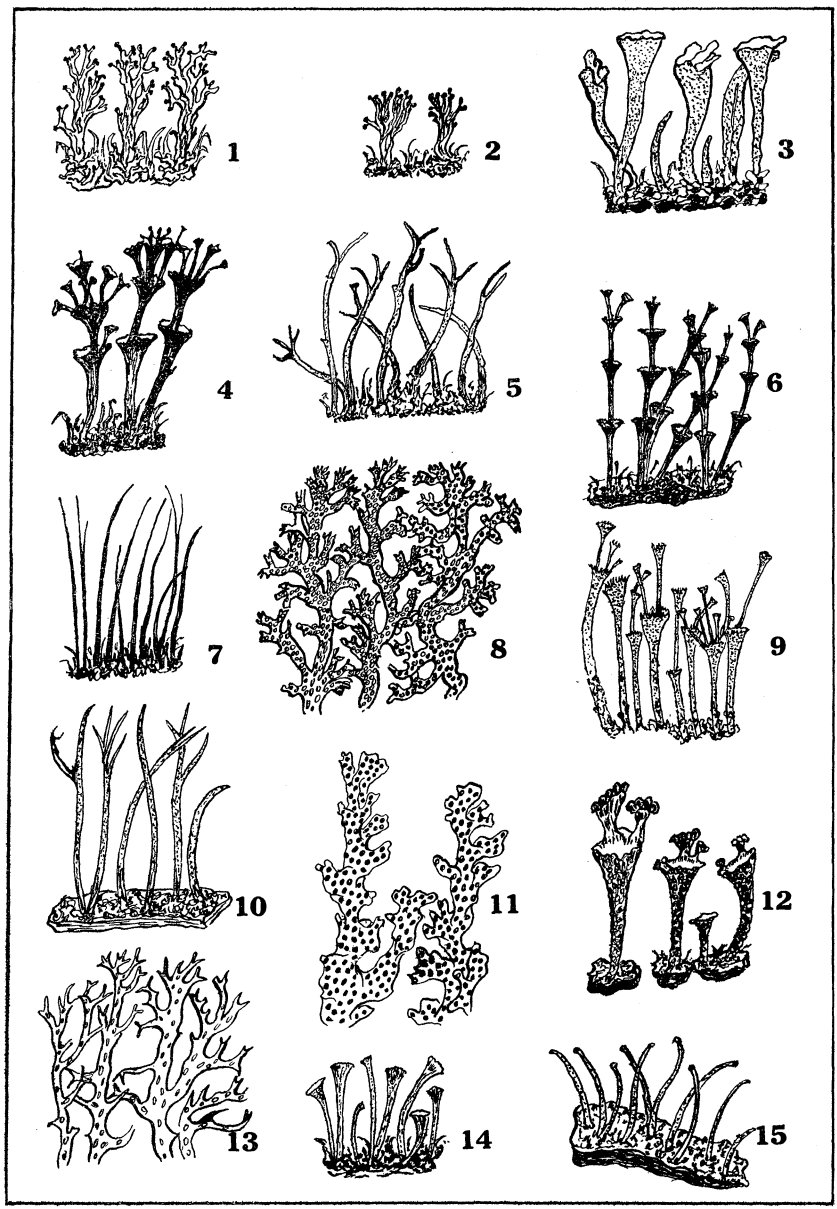
W. Martin, Dunedin

FOLLOWING the Science Congress of A.N.Z.A.A.S. held at Dunedin in January 1957, a party of members of the Botany Section spent a week examining the vegetation of Otago and Southland under the guidance of Prof. Baylis, the writer assisting with the cryptogamic flora, but paying particular attention to the lichens of the genus *Cladonia* to which the following notes refer.

The first area studied was a remnant of the once extensive Awarua bog between Invercargill and Bluff. Here in a clump of manuka the first plants were collected. These included *C. aggregata* and *C. cornutoradiata,* each in several forms, the former being mostly brownish plants with polished but perforated stems forming bushy cushions, the latter comprising mainly unbranched white or green stems (podetia) with dull powdery walls. One variety has three or four series of cups each originating on the margin of the cup or scyphus below, from which fact the name—var. *repititoprolifera*—has been derived. It is a very attractive lichen. *C. verticillata,* in three forms, was also present. These also have several ranks of scyphi, but each originates in the centre of the lower cup. The rare *C. carneola,* which also occurs here, was not seen on this occasion.

The next area investigated was the herbfield and grassland lying between the bush-line and the summit of the Longwood Range. On one rock with a scanty soil veneer the small *C. pitgrea* formed a compact turf in association with two "pixie cup" species—*C. pleurota* with scarlet "fruit" (apothecia) and the brown-fruited *C. fimbriata,* usually sterile, however. Near the summit *C. Sullivani* put in an appearance. This is a bushy, brown species with very numerous wall perforations through which the black-coloured interior is visible. It ranges from the Volcanic Plateau to Stewart Island, usually in subalpine or montane areas but is very common in peat swamps near Kuriwao near Clinton.

The third area examined was the manuka heath close to Lake Manapouri Hostel. Of numerous species growing in this area the largest, commonest, and most conspicuous is *C. leptoclada,* a species not hitherto reported from New Zealand. Doubtless it would formerly have been listed as a form of *C. pycnoclada;* but this species is now said to be endemic to South America. Three scarlet-fruited species are




Some characteristic Cladonias of New Zealand: 1—*C. neo-zelandica*; 2—*C. enantia*; 3—*C. deformis*; 4—*C. verticillata*; 5—*C. ochrochlora*; 6—*C. verticillata* var. *evoluta*; 7—*C. gracilis* var. *chordalis*; 8—*C. retipora*; 9—*C. cornutoradiata* forma *repititoprolifera*; 10—*C. cornutoradiata* forma *subulata*; 11—*C. Sullivanii*; 12—*C. coccifera*; 13—*C. aggregata* forma; 14—*C. major*; 15—*C. coniocraea*.

here conspicuous of which the scyphose *C. pleurota* is the most noticeable. The other two—*C. macilenta* and *C. Floerkeana*—though very similar and cupless, may be distinguished by placing a drop of a solution of caustic potash on the podetium, when a bright yellow colour results in *C. macilenta* only. Three rather tall and conspicuous species here present are *C. cornutoradiata* forma *subulata, C. scabriuscula,* and *C. capitellata* f. *fastigiata.* Of considerable interest was the discovery here of *C. neozelandica,* an endemic species not previously known from the South Island.

At the head of the Cleddau Valley above the Homer Tunnel, a short period of investigation proved fruitful. The most conspicuous *Cladonia* because of its bright yellow colour was *C. deformis,* a rather tall, robust species without scyphi or with cups usually much deformed, whence its name. A discovery of major importance was the location of the coral lichen with the primary thallus still attached, an observation corroborated by Dr. Evans of Yale University, a world authority on the Cladoniae. The importance of this find lies in the fact that a primary thallus was believed not to exist in the subgenus *Clathrina,* for which reason Duvigneaud had proposed to transfer its three species—*C. aggregata, C. Sullivani,* and *C. retipora* to a new genus *Cladia* constituting a new family, the Clathrinaceae. What is probably the rare *C. metalepta,* only once previously found in each island, was also noted.

Much the most prolific collection of Cladonias seen on the tour occurred on beech logs and tree-stumps by the roadside at Cascade Creek in Eglington Valley. They grew not only in great variety but in great quantity and luxuriance. Five species of Cocciferae—the scarlet fruited species—were observed including both *C. digitata* and *C. subdigitata,* and the rather rare *C. hypoxantha* (previously listed as *C. endoxantha*). *C. capitata* (formerly *C. mitrula*) was observed. The common *C. verticillata* and the somewhat similar *C. gracilis* were each present in three distinct forms, one of the commonest being *C. gracilis* var. *chordalis,* usually without cups. *C. cylindrica* (formerly *C. cornuta* var. *cylindrica*) occured sparingly.

The Perviae, comprising those species with perforated or gaping axils and open cups, were represented by *C. crispata,* the similar *C. carassensis* (formerly *C. japonica*), *C. scabriuscula* (vars. *cancellata* and *sublevis*), and *C. capitellata. C. mitis* f. *attenuata* known only from this area was not observed.

On a separate afternoon excursion to Mt. Cargill at Dunedin, the endemic *C. neozelandica* was collected. The only other endemic species is *C. enantia,* also known hitherto from the North Island only. It is worthy of record that the writer has since collected this on Saddle Hill near Dunedin; and *C. neozelandica* has been collected recently in five South Island localities.

The South Island *Cladonia* flora is now moderately well known, but there remains room for much further research in the North Island. Anyone undertaking their study will find the best habitats are usually logs on the forest margin, the bases of tall tussock at the margin of peat swamp, and manuka heath soils. As many as forty distinct taxa have several times been collected by the writer in an area not exceeding a square chain.

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