

sedge bogs are regularly grazed and shrubs round the margins invariably chewed whatever they happen to be. Above 300 to 400 feet the forest is relatively untouched, except that most pokaka trees (*Elaeocarpus hookerianus*) are barked, until at the bushline and on the tops damage is again evident.

In general the wapiti have done more damage to the undergrowth than to the dominant trees such as silver beech. Although wapiti have a low rate of increase they will have to be watched and their numbers kept down as far as possible. At this stage it is unlikely that they will ever be exterminated.

—A.P.D.

Notes on Some Water Plants

R. MASON

LEMNACEAE

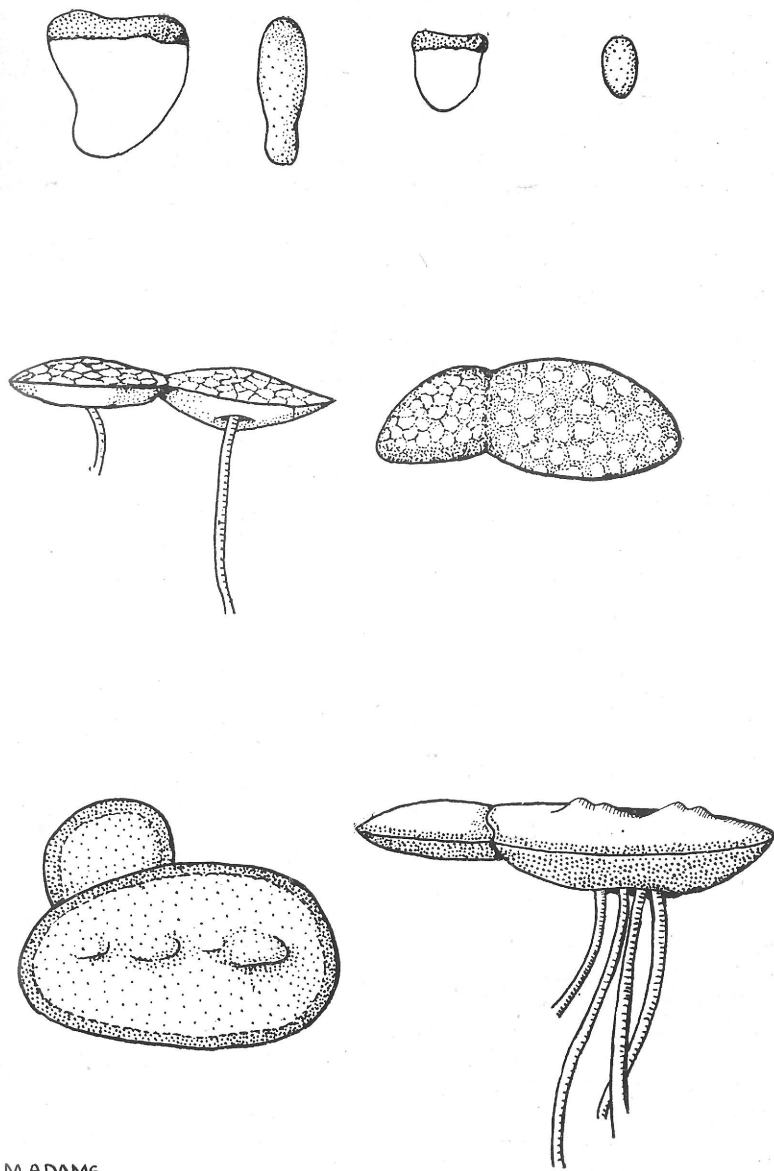
Three members of this family have been recorded in New Zealand: *Lemna minor*, L., duckweed, which is fairly common on rather still waters; *Spirodela oligorrhiza* (Kurz) Heglm., (as *Lemna oligorrhiza*), collected by T. L. Lancaster on a pond near Palmerston North in 1929; and *Lemna gibba*, L., recorded from Poverty Bay and not, apparently, seen again.

In October 1948 I noticed some plants like small green pinheads floating amongst some duckweed in a pond at Washdyke, South Canterbury. Examination showed that they were not seedlings of *Lemna minor*, as first thought, but something as interesting, one of the smallest known flowering plants, *Wolffia arrhiza*, Linn.

The plants were clear bright green above the water, about $\frac{3}{4}$ mm. long, elliptical in surface view, white below the water, and generally rather deeper than long; they were actively budding into two. They were found on only one of the many ponds and covered only a small area. By February the plants had increased greatly in number and spread to other ponds.

In December Miss N. M. Adams found the same plant on a pond near Waikanae Estuary and it was seen in February by Dr. Cottam of the Wildlife Branch of the U.S. Department of Agriculture in a river-cutoff near Palmerston North. On March 20 Miss A. Lush found it at the mouth of the Ohau River, this time in flower. It is a native of Europe, India, and Australia.

Spirodela oligorrhiza has recently been found again in the Manawatu district: Lake Karere, a cutoff of the Manawatu River, R. Mason 11/3/48, N. Moar! 24/3/49; Waikanae, A. Cook! 8/1/49; Ohau River mouth, A. Lush! 20/3/49; L. B. Moore! 6/6/49. It was found at Napier, R. P. Hill! May 1949.



N.M.ADAMS.

Top to bottom: *Wolffia arrhiza*, *Lemna minor*, *Spirodela oligorrhiza*, each in surface and side view (x10).

The presence of more than one root (two to four) puts this plant in the genus *Spirodela*, not in *Lemna*, which has one root. It is further distinguished from *L. minor* by its more swollen form and the purple colour beneath. It is about 1½-2mm. long.

S. oligorrhiza is recorded from India, Australia, and North America.

POTAMOGETONACEAE

Apparently Hagstrom's monograph on the Potamogetons (Kungl. Svenska Vetenskapsakad. Handl. 55:5 1916) has been overlooked by botanists in New Zealand. Hagstrom records five species, *P. cheesemanii*, A. Benn., *P. suboblongus*, Hagstr., *P. ochreatus*, Raoul, *P. porrigens*, Hagstr., and *P. membranaceus*, Hagstr. *P. ochreatus* and *P. cheesemanii* are the same plants as recorded by Cheeseman.

P. suboblongus, a new species confined to New Zealand, is the plant recorded by Cheeseman as *P. polygonifolius*, Pourr. It differs from *P. polygonifolius*, a European plant, in having swollen fruit rounded on the back, whereas those of *P. polygonifolius* are flat and keeled. The type specimens are those collected by Cheeseman at Taupaki, Kaipara, March 1894. Cockayne's specimens from Canterbury (no. 6727) placed under *P. polygonifolius* by Ascherson and Graebner (Das Pflanzenreich) are *P. suboblongus*. It differs from *P. cheesemanii* in having rather smaller fruit (2 x 1.5 mm.), rounded on the back, whereas those of *P. cheesemanii* are three-keeled; *P. suboblongus* has not a distinct type of submerged leaf.

P. porrigens is a new species closely related to *P. cheesemanii*. It was collected by Berggren in 1874, the monograph stating at Hokianga, but a photograph of the type of specimen shows the locality to be Lake Pearson. It has small oblong-lanceolate leaves about 20 mm. long, 6 mm. broad, obtuse, with 5 to 7 nerves, and long filiform petioles (10-15 cm.); it has narrow membranous submerged leaves. The flowering spike is short, 8-10 mm. long, the fruit not known.

P. membranaceus, Hagstr., is a new species collected by Cheeseman in 1884 at Wai-iti Stream, Waikato. It has membranous submerged leaves only, entire, lanceolate, with a shortly mucronate tip. The flowering spike is about 15 mm. long and dense; the fruit is not known.

Some plants similar to *P. porrigens* have been collected in the mountains of the South Island, but *P. membranaceus* seems unknown to New Zealand botanists. There is need for much more collecting of potamogetons from various localities and habitats.

Besides these species Cheeseman records *P. natans*, L., and *P. pectinatus*, L. It is most unlikely that *P. natans*, a European plant, occurs in New Zealand. It is a plant with large fruit (3.5 to 5 mm. by 2.5 to 3.5 mm.), with flat or concave sides, and large, many-nerved (25-27) leaves, often cordate. Plants with similar leaves are found in New Zealand, but they all have the small rounded fruit of *P. suboblongus* and appear to be large-leaved forms of that plant. *P. poly-*

gonifolius shows great variation in leaf size and shape and the related *P. suboblongus* seems to do likewise.

P. pectinatus, L., (the New Zealand form), is recorded from several new stations: Lake Kaikokopu (Huniu, Himitangi), R. Mason, 12/3/48; Lake Koputara, R. Mason, 12/3/48; Castlepoint, V. D. Zotov! 24/3/45, R. Mason 6/5/48; Lake Ellesmere, R. A. Wilson! 1931, (Lakeside) R. Mason 19/2/48, (Kaituna) 20/2/48; Washdyke, R. Mason, 16/2/48, May 1948, 26/2/49; Lake Wainono, R. Mason, 26/4/48.

RUPPIACEAE

W. A. Setchell has shown (Proc. Cal. Acad. Sci. 4th series 25: 18) that Linnaeus's two species, *Ruppia maritima* and *R. spiralis*, have been confused by many later writers. Our New Zealand plant, with elongated spiral peduncles, is *R. spiralis*, L.

(Some other new records of water plants will be published in Bulletin No. 22.—Ed.)

Some Australian Plants

To an audience of about thirty members at the meeting on June 20, Dr. J. T. Salmon apologized for changing the subject of his talk from plants of New Zealand to those of Australia. He said that not being a botanist he had felt diffident about talking to botanists on plants of their own country, but now that he saw Professor Gordon among his listeners he wondered if he should not have stuck to New Zealand plants after all. However, there was no such doubt in the minds of his audience when they saw his glorious coloured slides of Australian flowers. The Geraldton wax plant, kangaroo paws, yellow and red gums some with flowers as big as saucers, a red bottle-brush, dwarf banksia, cycads and grass-trees are a few of the many which delighted the eye. Wattles were represented by the brilliant yellow South Australian wattle and an enormous golden wattle tree. The flame tree against a blue sky made a very pleasing picture. Photographs of the Sydney Botanical Gardens showed a great massing of colour in the beds. Of these the show of azaleas was particularly outstanding. Too soon the delight of form and colour came to an end, but leaving us with the knowledge if we did not have it already that Dr. Salmon is not only a scientist but an artist also. —I.M.M.

Vegetation and Man

On March 21, Miss J. Sansom, who is in New Zealand on a Goldsmiths' Scholarship and is at present studying the ecology of some of the beech forest on the eastern side of the Rimutakas, spoke of the influence of man on the vegetation of Great Britain. Her detailed summary of the changes that have taken place from about 9000 B.C. up to recent times was both interesting and instructive. She pointed