stolon of *Nymphaea flava*, which contain five, four, or as few as three bundles each, to those with two bundles in the secondary stolons of the same plant and of *N. blanda*, and also in the stem and floral peduncles of *Cabomba*. Indeed, in the secondary stolons of *N. flava* and *N. blanda* the two bundles of any pair may in their course fuse completely together and become a single bundle comparable to a bundle in the stem of *Nelumbium nuciferum*.

We see then that in this order a complete series of transitions can be traced from typical polystely to the well-known astelic condition.

D. T. GWYNNE-VAUGHAN.

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DEMONSTRATION OF ROOT-PRESSURE AND TRANSPIRATION.—I have found that root-pressure may be conveniently demonstrated and measured by means of an ordinary Bourdon's pressure-gauge. To give an instance:—a few weeks ago, one of these instruments, connected with a branch of a Vine growing in the open, gave readings up to a maximum pressure of 10 lbs. to the square inch. I am arranging to have an instrument of this kind made with a special view to this purpose, provided with an adaptation for obtaining a graphic tracing on a revolving drum, and I am inclined to think that it may be possible by this means to obtain more accurate knowledge than we at present possess on such points as the daily period of the root-pressure and the influence upon it of variations in the external conditions.

With regard, now, to transpiration, the recent researches of Dixon and Joly¹, and of Askenasy², seem to make the determination of the suction-force of a transpiring plant a point of great importance. Boehm³ succeeded in causing a transpiring branch to raise a column of mercury 900 m.m.—that is, the branch exerted a suction-force of about 140 m.m.—and that is all the information that we possess at present in the way of measurement of the force which is now regarded as the efficient cause of the transpiration-current.

A year ago I attempted to make some measurements of this force

¹ Dixon and Joly: On the Ascent of Sap; Annals of Botany, Vol. viii, 1894; Proc. Roy. Soc., Vol. lvii, 1895; Phil. Trans. 1895.

² Askenasy: Ueber das Saftsteigen; Verhandl. d. Naturhist.-med. Vereins zu Heidelberg, Neue Folge, Bd. v, 1895 and 1896.

³ Boehm: Ber. d. deut. bot. Ges. 1893.

by placing branches in air-tight connexion with a closed vessel of water communicating with a mercurial barometer. My experiments were made with not very large branches, and were few in number as they had to be suddenly brought to a close; but some of the results were sufficiently striking. Thus, with a branch of Cherry-laurel, the mercury sank 190 m.m. in four hours; that is, the suction-force of the branch was equal to one-fourth of an atmosphere.

I am now resuming the experiments, substituting a Bourdon's¹ vacuum-gauge for the mercurial barometer, and with still more striking results. Thus, a vigorous branch of Beech, bearing about 1,100 leaves, gave an indicated suction-force of rather over twenty-one inches of mercury (about 530 m.m.) within one hour. As I did not succeed in obtaining a higher reading, I am inclined to regard this as a measure of the suction-force of this branch. The record is briefly as follows:—

2.40 p.m.	indicator of gauge	=	0 inches of mercury
2.50	„ „ „	=	14 „ „
3.00	„ „ „	=	18½ „ „
3.25	„ „ „	=	21 „ „
3.40	„ „ „	=	21 „ „

Some indication of the nature of the relation between the suction-force and the leaf-area of a branch is afforded by the remarkable fact that the gradual reduction, to the extent of 900, of the number of leaves borne by the above-mentioned branch of Beech, produced no proportionate—or even perceptible—diminution in the indicated suction-force. Full details will appear in a subsequent number of the Annals.

S. H. VINES.

THE DIGESTIVE FERMENT OF NEPENTHES.—In view of statements which have appeared of late years throwing doubt upon the digestive function of the pitchers of *Nepenthes*, and upon the possibility of obtaining from them a peptic enzyme, I have thought it worth while to repeat the experiments on the subject which I made in the year 1876. I propose to publish a full account of these repeated experiments in a future number of this periodical: but I think it well to take this early opportunity of stating that, so far as the work has been carried at present, the results completely accord with those at which I arrived twenty years ago.

S. H. VINES.

¹ The Bourdon's gauges used in these experiments were kindly lent to me by Messrs. Elliott Bros. of St. Martin's Lane, London.

Vines, Sydney Howard. 1896. "Demonstration of root pressure and transpiration." *Annals of botany* 10, 291–292.

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