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stomatiferous species with spiral elaters. The important differences between Megaceros and Anthoceros are that the former has multiple chromatophores, no stomata, a solitary antheridium, spiral elaters, and green spores. In one species (M. salakensis) the sporogonium dehisces along one side. The thallus closely resembles that of Anthoceros. The reviewer has frequently observed single antheridia in A. laevis and the same is reported for A. Pearsoni. The axial row is cut out of the archegonium initial by three intersecting walls, as is true for all Hepaticae. The neck-canal cells are four, rarely five. The early development of the embryo and details of the sporogonium closely resemble Dendroceros, but the sporogenous tissue is more extensive than in either Anthoceros or Dendroceros. One figure suggests that perhaps a portion of the tip of the endothecium is sporogenous, as has been found in Notothylas by Lang. The sterile cells form an irregular network inclosing the spore mother cells, which are slightly lobed. The elaters are branched. No germ tube is produced.

Two Javanese species of Dendroceros, designated A and B, were studied. Species A had a better-developed columella than B. In a Jamaican species the reviewer finds that the tip of the sporogonium is occasionally sterile. Spores of A and B, as well as other Javanese species of Dendroceros, germinate before being shed.

Notothylas javanicus closely resembles the cosmopolitan N. orbicularis. The archegonia are broader than in Anthoceros, but the neck-canal cells are reduced to three. The first division of the embryo is longitudinal, and not transverse as Mottier thinks is true in N. orbicularis. It is suggested that possibly the endothecium contributes something toward sporogenous tissue, as has been recently shown in another species of Notothylas by Lang, although Campbell makes no mention of Lang's work.

Campbell thinks that perhaps the affinities of the Anthocerotales are with the Marchantiales rather than with the Jungermanniales; that perhaps the sporogonium of Notothylas is best compared with that of Cyathodium. He thinks that the relationships of the group are so remote from other Hepaticae that it should form a special class, "Anthocerotes."—W. J. G. Land.

Ever-sporting varieties and variegation.—Ever-sporting varieties have received illuminating treatment by Baur,¹⁴ who places the sport condition among the normal fluctuating reactions of the particular variety in question. When there is a complete parallelism between the modification of a character and the variation of external stimuli which cause the modification, a chance distribution of varieties results; but when this parallelism is only partial, as is frequently the case, a "half-Galton" or otherwise modified curve will appear, and the occurrence of such modified curves may serve as a sign of ever-sporting varieties.

The sport condition appears only when a certain intensity of the combi-

nations of external modifying stimuli and nutritive conditions, in the widest sense, is exceeded. In each ever-sporting variety there is a critical period at which the "normal" or the "sport" condition is determined. If this period occurs late in the ontogeny, the sport appears as a partial variation, as in the five-leafed clovers; and if it is very early in the ontogeny, the variation appears to be individual, as in the case of double stocks.

A sharp distinction is drawn between these modifications and mutations, and KLEBS is criticized for failing to keep them separate. This criticism would apply equally well to many other writers.

With ever-sporting varieties, many variegate-leaved varieties have a great but purely superficial resemblance. The author recognizes two types of golden modification, one due to disease, the other hereditary. Pedigree cultures with the latter type present striking results in the case of Antirrhinum majus pumilum fol. aureis and Pelargonium zonale. In Antirrhinum the cross between any two variegated specimens gives variegated and green in ratio 2:1, of which the green breed true. The conclusion was reached that variegation is in this case a Mendelian character, in which the union of two "variegated" gametes does not give rise to a successful zygote. In proof of this view, the cross between variegated and green (DR×R) gave in every case the expected ratio 1:1. Every variegated individual is thus a heterozygote, and the problem of the "fixation" of the variegated race is the same as that of the fixation of the blue Andalusian race of fowls.

In Pelargonium zonale a somewhat similar situation seems to exist, but here the extracted dominants, instead of being entirely incapable of development, appear as pure-white individuals which perish very early, leaving again the ratio of variegated to green, 2DR:1R.—GEO. H. SHULL.

Injury by smoke.—Continuing the studies embodied in the volume published a few years ago on the injury of vegetation by smoke,¹⁵ which treated chiefly of gases, HASSELHOFF, with the assistance of several colleagues, has been investigating the effect of the solid constituents of smoke and other factory emanations, which fall as dust, and may injure plants either directly by contact with their leaves or indirectly through their roots by way of the soil.¹⁶ Such investigations are particularly important in continental countries, where huge factories are often closely surrounded by cultivated fields. They are of less value in this country, where the cultivation is less close and a strong tendency exists to mass factories in industrial centers. Yet at any time such data as are here set forth may be called for as a guide for legislation, or in civil cases.

HASSELHOFF finds that the dust varies much in composition even from similar fuels and the same sort of factories, so that it becomes necessary in each case to determine its composition. Chlorids (NaCl), sulfids (NaSO₂ and Ca(SO₂)₂), and perhaps also sulfates (NaSO₄) are particularly injurious. The sulfids are
