over having sent fourteen specimens of a very complex species to a specialist and having them returned to him under fifteen different names. I believe he doubtfully accepted three entities as involving the fifteen names. He retold this story many times, always closing it with rollicking laughter.

Mr. Clokey is survived by his widow, Mrs. Cleora Brooks Clokey, who accompanied him on many of his collecting expeditions and who often assisted him with the preparation of specimens, and by two daughters.—Herbert L. Mason, Department of Botany, University of California, Berkeley.

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A GRAPHIC REPRESENTATION OF BESSEY'S TAXONOMIC SYSTEM

R. Lucas Rodriguez C.

The present diagram (fig. 1) is an effort to show Bessey's (1915) orders of Angiosperms and their relationships, with reference to the main characteristics which distinguish them and which are held to indicate their degree of primitiveness or advancement.

Studying Bessey's system one comes into acquaintance with his chart (fig. 2) in which he showed the relationship of the orders and, approximately, the number of species in each. When lines are drawn on this familiar "cactus plant" diagram to separate one characteristic from its opposite, they interweave, necessarily, in irregular fashion.

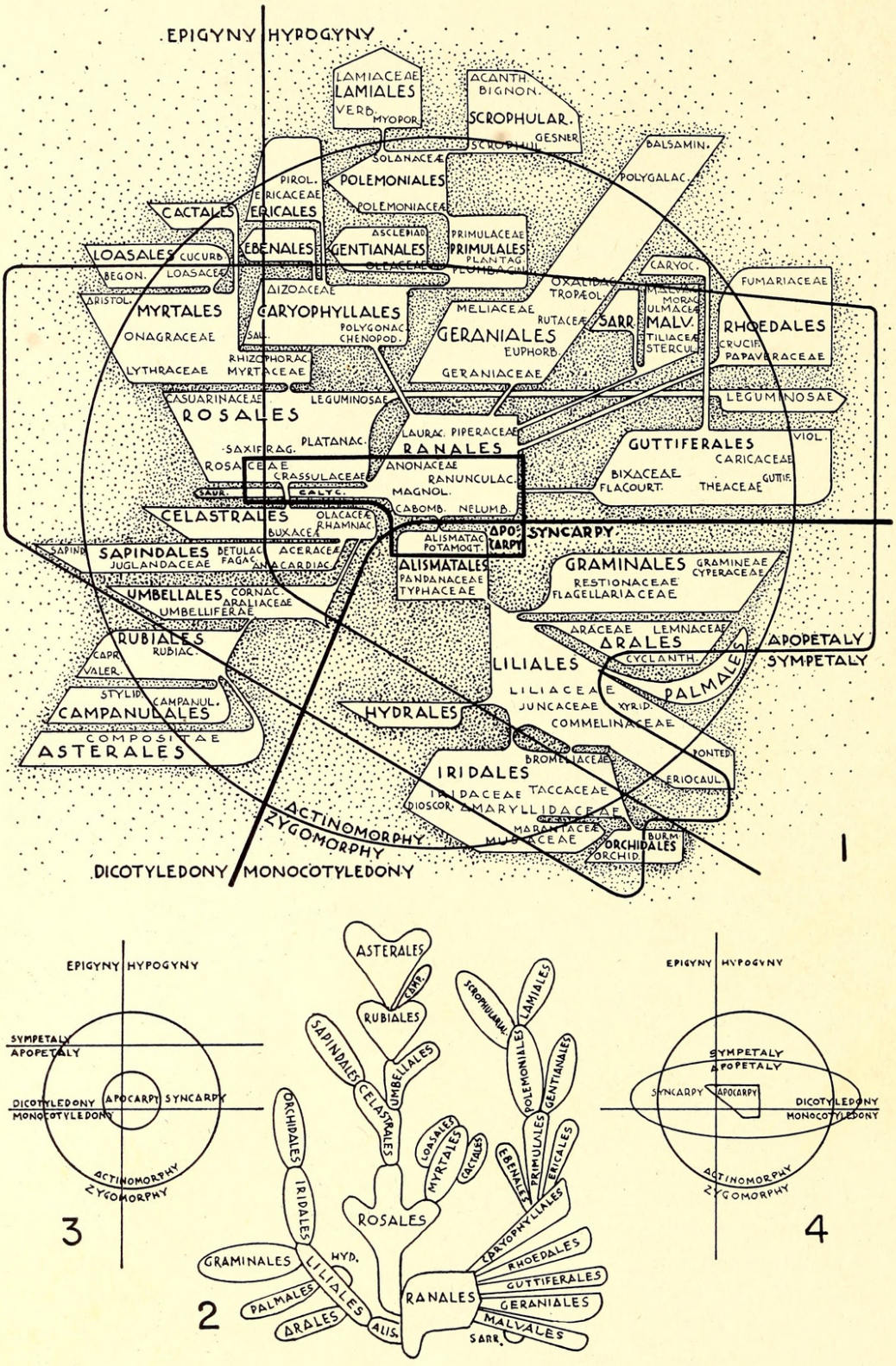
An attempt was made to plot the main divisions of characteristics significant in phylogenetic taxonomy as either straight lines or simple geometric curves (fig. 3), and make the branches of the "cactus plant" adapt to them. In this arrangement, the lines separating monocotyledony from dicotyledony, and sympetaly from apopetaly crossed at right angles that which represented the transition from hypogyny to epigyny; the transitions from apocarpy to syncarpy, and from actinomorphy to zygomorphy, were drawn as concentric circles, as required by successive levels of advancement reached by practically all postulated lines of descent. When Bessey's orders were arranged on this frame, th two most primitive orders, Ranales and Alismatales, occupied the center, and the different groups flowed radially out, the distance from the center becoming an indication of their degree of advancement. It was evident, however, that the transition to sympetaly should also be represented as a closed line, cutting in and out of the circle showing zygomorphy (fig. 4).

This layout proved more satisfactory as a starting point; but to avoid having both branches of the Oppositifoliae-Cotyloideae —the series ending in Loasales and Cactales, and that leading to the Asterales—twining around each other, it was again necessary to modify the general frame, reducing the space given to the monocotyledons and bending the line marking the change to epigyny. Such is the arrangement finally adopted for the diagram in fig. 1.

In this representation, Bessey's idea of showing the relative number of species in each group was abandoned, as the area covered by an order depends on the extremes of variation included within that order. In the diagram as given here, some families have been indicated in each order, to clarify somewhat the extension given to it.

Using this diagram as a working tool, it seemed interesting in the preparation of some seminar reports to plot additional characteristics on it, in order to compare other criteria for primitiveness with the accepted Besseyan concepts. In general, the lines marking off the trilacunar condition of the node (Sinnott, 1914) stipulate leaves (Sinnott and Bailey, 1914) and presence of endosperm, formed also closed curves, of necessity irregular but centering also on the Ranales. In each case there was at least one "avenue" along which the theoretically advanced condition reached the apparently primitive orders. The relative position of the families within each order as shown in fig. 1 already reflects the distinctions established by the additional criteria mentioned.

Bessey's original diagram has one disadvantage, that of appearing to be simultaneously a systematic chart and a genealogical tree. When the present diagram form is used, it becomes easier to keep in mind, or to show students, that neither of them is a "family tree" but a cross section at one time level (the present)



Figs. 1–4. Two interpretations of Bessey's orders of Angiosperms.

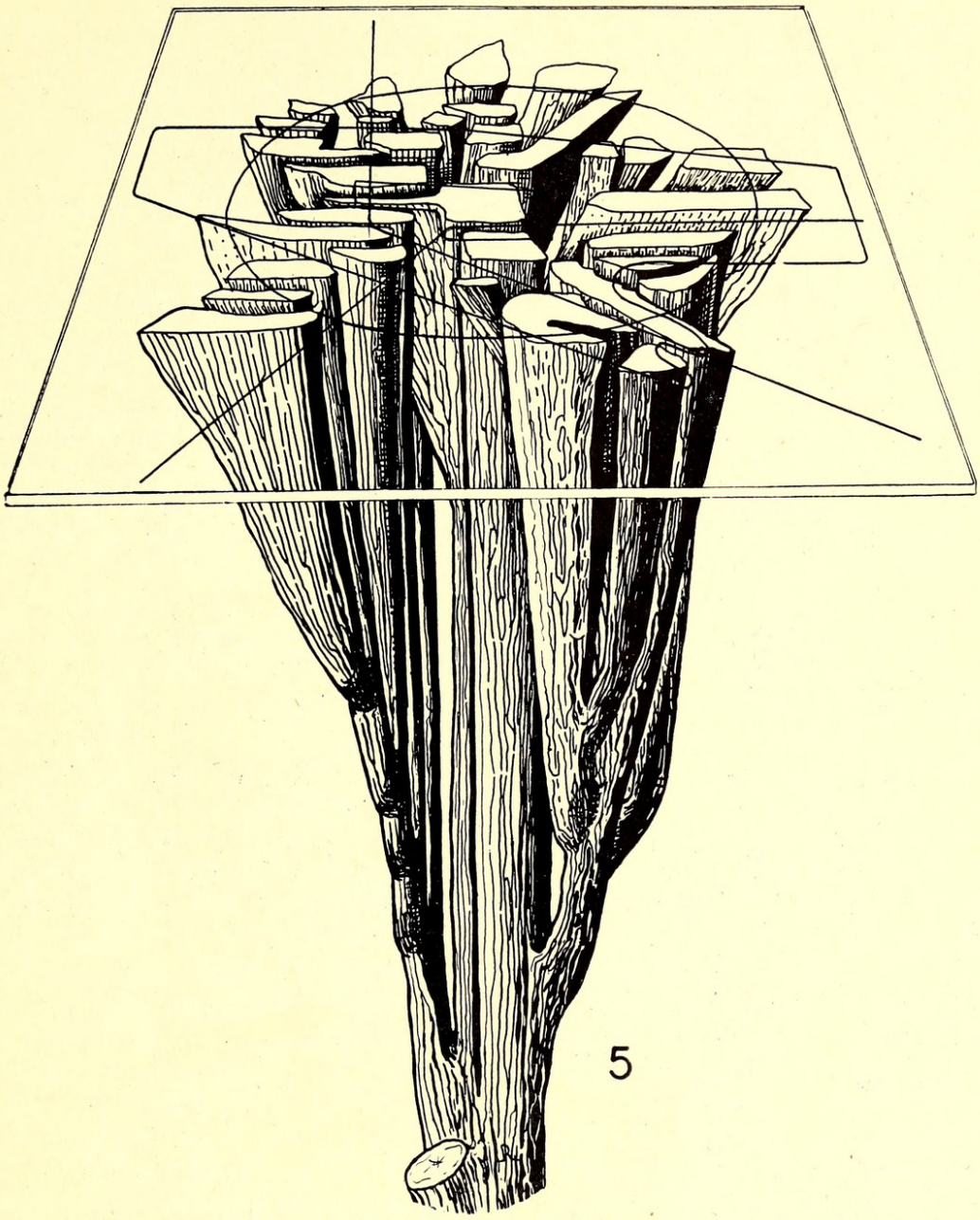


FIG. 5. The diagramatic interpretation of Bessey's system as a cross-section of the Angiosperm genealogical tree. The vertical dimension represents time. No factual value is attached to the relative levels at which the groups branch out from their putative predecessors.

of the true genealogical tree growing out of the past (fig. 5). The degree of divergence from the primitive condition corresponds to the distance from the axis of the tree, while the connections in both diagrams (figs. 1 and 2) between one order and another are projections of a connection which existed at an earlier time level. The frame of the diagram, drawn on the plane of a particular time level, is only an attempt to define the lines along which the several

series are diverging from the central stock, and the order in which the different changes are achieved. Considered in this manner, the diagram comes a little closer to Lam's (1936) ideal phylogenetic model, in which each detail, dimension or direction should have a definite meaning.

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DIOECIOUS MELANDRIUM IN WESTERN NORTH AMERICA

H. G. Baker

A history of the spread of *Melandrium dioicum* (L.) emend. Coss. and Germ. and *M. album* (Mill.) Garcke following their introduction (with impure clover seed from Europe and in rubbish from grain ships) into eastern North America has been given elsewhere (Baker, 1945, 1948a). A gradual spread westward is indicated, both species becoming more and more common in meadows, fields and waste places and along railroads in the ballast. There is no North American record of either species from a natural habitat, a fact of particular importance in the case of *M. dioicum* which seems ill-adapted for life as a weed (Baker, 1948b). In Europe plants with coloured petals occurring in cultivated land are of hybrid ancestry (involving *M. album*).

The means of introduction renders it likely that the material of *"M. dioicum"* arriving in America was already hybridised and, with the thrusting of the two obligatorily outbreeding forms into similar habitats, further hybridisation must have been an unavoidable consequence. Forms least resembling *M. dioicum* as it is known in Europe may be expected to have been selected. For this reason, now that the campions have become distributed throughout the United States, one would not expect recognisable *M. dioicum* to be found among the weeds of western North America.

The only specimens of *"M. dioicum"* from western North America available in wartime Britain were both collected in