

fifty years ago there was still such a wide-spread lack of clarity as regards the notion of group on the part of some of the most eminent mathematicians of the day. The same volume which contains the mentioned remarks by Felix Klein contains also the modern postulates with respect to an abstract group by H. Weber (1842-1913) so that darkness and light relating to this concept are here closely associated.

Neither Sophus Lie nor Felix Klein ever adopted the modern postulates for an abstract group in their writings and in volume 1 (1926), page 335, of his "Vorlesungen über die Entwicklung der Mathematik" the latter remarked that the definition of group based on such postulates is very well suited for instruction and for a clear development of the subject but not for the discovery of new ideas and new methods. He stated on the same page that both he and Sophus Lie in their early work in group theory assumed only that the product of every two of a given set of elements is in the set in order that the set is a group but that Sophus Lie found it necessary in his later work to explicitly assume also that the set includes the inverse of each of its elements as a part of the definition of the term group.

On the contrary, the group theory postulates of H. Weber, or their equivalents, were at once taken very seriously in America, largely on account of the very successful works on algebra which he published and which contain these postulates. Various attempts were made in America to obtain more useful sets of postulates. As regards group theory these efforts were conducive to caution so that the laws or commandments as regards the concept of group were not transgressed but they did not lead to any great advances within the subject itself. The dilemma of Sophus Lie and Felix Klein to which we referred above was due to the fact that in their early work they had tacitly assumed that it is unnecessary to restrict the group concept to sets of elements which always include the inverse of each element but that they later abandoned this idea.

It is questionable whether any publication contributed more than Felix Klein's Erlangen Programm towards making the subject of group theory widely known and highly appreciated. It was translated into Italian (1890), into French (1891), into English (1893), into Polish (1895), into Russian (1896) and into Hungarian (1897). Nevertheless, according to Felix Klein's own statement it contains an inadequate definition of the group concept but one which includes its most effective elements. Those who later refined this definition also made valuable contributions towards the advancement of this subject, but their work naturally received less extensive attention. Great mathematical progress was frequently made by

those who failed to observe pitfalls which their successors carefully labeled and which too frequently engrossed their attention.

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PENTHESTES AND CALOPHYA

THAT black-capped chickadees are making a substantial part of their winter diet on "jumping plant-lice" along the Connecticut shore may interest zoologists; that the psyllids are found upon sumac may interest botanists; and that *Calophya flavida* in its present nymphal stage abounds on *Rhus glabra*, while *Calophya nigripennis* abounds on *Rhus copallina* may interest ecologists. The two species of sumac, growing in close admixture, carry only their proper species of psyllid, never the other one. Dr. Oman, who determined the psyllids for me, informs me that only these two species of *Calophya* are known to occur in eastern United States.

Early this winter, 1941-42, I observed chickadees feeding freely on the very abundant sumacs of this region, interested not only in the fruit clusters but also picking minute objects from the stems of these shrubs, both low down near the ground and higher up. With field-glasses permitting very close-up work I saw that they took these from areas surrounding leaf-buds also from areas close to forks in the branches primarily. With a hand lens I examined the areas the birds had just worked, and found plenty of the beautifully sculptured nymphs. Those of *C. flavida* are darker and larger and have more marginal setae than nymphs of *C. nigripennis*. The numbers of both species are diminishing, under the attacks of the chickadee, as winter progresses. The birds are also feeding on many other animal and plant foods. Had their stomach contents been examined the nymphs might never have been recognized and determined, except as pulp of animal origin.

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DEGREES AT ANY TIME: BRAIN CONSERVATION

IN a recent number of SCIENCE¹ the writer discussed the importance of a twelve-month college year to insure earlier completion of curricular requirements. This was prompted by the frequently expressed desire in various quarters that students have the opportunity to complete their collegiate education before reaching draft age. It was pointed out that the plan was desirable not only in war-time, but that it was a good peace-time idea. Just as the article on the twelve-month college year was a long postponed sequel to a post-World War I article,² so the present discussion

¹ A. Silverman, SCIENCE, 95: 192, 1942.