was in no way consequent upon the activities or products of the males. Still later[3] more than 5,000 females and 13 males of *A. eurycephalus* had been produced parthenogenetically, mostly from females which had not been exposed to males of any kind, and some of them had been carried seven consecutive generations without exposure to males.

Comparable results were obtained from the parthenogenetic breeding of *P. texanus*[4] and *Telmatettix aztecus*.[5]

All the partheno-produced individuals, including two males which were tested by further breeding, with one or two possible exceptions, proved to be homozygous for the several characteristics noted. The two tested males and several of the females, taken at random, were examined cytologically by W. R. B. Robertson. He has ascertained[6] that the homozygous pairs, respectively, of the chromosomes of the soma and oogonia lie together in early cell divisions, and not far apart, each from the other, in later cell divisions, in such position as to suggest that the second polar body division had been inhibited.[4] The second polocyte division in the grouse locusts, as in other forms, is probably normally consequent upon the entrance of the sperm, another case of "a later stage of maturation being overlapped by an early stage of fertilization."[7] In the absence of the fertilizing sperm and the resultant complete or partial inhibition of the last polocyte division, the diploidal condition is retained or restored, and if the specific or complementary genes responsible for the parthenogenetic processes are present, a chemical situation arises which conditions the initiation of development. Since it appears that any egg of these species is capable of being fertilized (those without the genes responsible for parthenogenesis require it), such educement of development may, perhaps, be considered *induced* or *artificial* parthenogenesis.[4]

It should be noted that Peacock and Harrison (1925–6)[8] advanced the very interesting hypothesis *that parthenogenesis was consequent upon hybridity,* using as a basis their work with hybrid moths from the crossing of *Tephrosia bistortata* males with *T. crepuscularia* females, and finding support from the materials used and results of the parthenogenetic breeding of the grouse locusts (*loc. cit.*). This hypothesis is probably valid, but it should be provided, in addition, that the process of hybridism may bring together specific, complementary or climaxing genes which are responsible for, or cause, as a kind of hybrid emergence,[9] the development of the unfertilized egg.

The list of instances of tychoparthenogenesis among such organisms as the grouse locusts, moths and, apparently, the plants used in Dr. East's experiments is constantly augmenting, and it is probably as yet far from complete. If a mutation, or stable, hybrid emergence, of sufficient transcendence should occur among the females of such, and since males do occasionally occur, certainly among the parthenogenetic grouse locusts, at least one long recognized major difficulty besetting the supposition of species transmutation might be considered as partially obviated.

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[3] *Kansas Tech. Bull.*, 17, 1925.
[4] *Biol. Bull.*, 66 (2): 129–155, 1929, and *Bibliographia Genetica*, 5: 27–104, 1929.
[5] *Genetics*, 13: 126–132, 1928.
[6] *Jour. Morph.*, 1930.
[7] E. B. Wilson, "The Cell," 1925.
[8] See literature cited, *Biol. Bull.*, 66: 155.

MUSICAL PITCH AND PHYSICAL PITCH

THE suggestion made by W. B. White in SCIENCE of September 19, that men of science entirely abandon the pitch standardization based on making middle C equal to 256 cycles, is a healthy one. But his positive suggestion of substituting for it a standard A of 440 cycles could serve well only those acousticians who are concerned with problems of music, that is, the esthetic-artistic side of acoustics. On the other hand, telephone engineers and psychologists interested in sensation units or in hardness of hearing and like problems which have no direct relation to music ought to use 1,000 cycles as their primary pitch standard and multiples and fractions of 1,000 as their auxiliary standards, such as 50, 100, 250, 500, 1,000, 2,000, 4,000, 5,000 cycles.

The remark by Mr. White that the discrepancy between any artificial scales used by physicists and musicians becomes particularly serious in the higher regions is meaningless to musicians, since mistuning in all regions is to them a purely relative matter. Physicists, however, will no longer suffer if they wholeheartedly, instead of half-heartedly as in their middle C custom rightly criticized, emancipate themselves from the orchestra leaders. The present writer happens to be equally interested in mere hearing and in music; and he has for almost a lifetime found a complete divorce of the two methods of standardizing extremely satisfactory for both purposes. By all means let every man of science for all purposes abandon the middle C of 256 cycles. But audiometers and similar instruments ought to be standardized on a decimal scale of cycles having 1,000 as its center.

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[9] SCIENCE, April 11, 1930.