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Editorial and Publishing Offices :

MACMILLAN & CO., LTD.,  
ST. MARTIN'S STREET, LONDON, W.C.2.

Telephone Number: GERRARD 8830.

Telegraphic Address: PHUSIS, WESTRAND, LONDON.

No. 3102, VOL. 123]

Co-education.

SCIENCE does not give a clear lead on the question of co-education. The physiological and psychological differences between the sexes are not 'significant' enough to determine whether the sexes should preferably be educated together or apart. When in 1922 the Consultative Committee of the Board of Education was preparing its valuable report on "Differentiation of the Curriculum for Boys and Girls respectively in Secondary Schools," it wisely consulted a distinguished medical man, the late Dr. J. G. Adami, on the anatomical and physiological differences between the sexes. Dr. Adami classified those differences under four headings—(a) rate of growth; (b) date of adolescence; (c) anatomical age; and (d) after puberty, the composition of the blood—and gave the Committee all the information available on the interrelationship of the internal secretions and the essential and secondary organs of sex; for, as he said, "obviously it has a profound bearing upon the problem before the Committee."

The lower proportion of red blood corpuscles in women has been established by several workers. Dr. Adami discussed at some length recent work on the calcium metabolism of the body, referring especially to Blair Bell's conclusion that, with the onset of puberty, the calcium metabolism in the female becomes unstable, whereas in the male it remains comparatively constant. The committee observes that at that time Blair Bell's views had not been generally accepted by physiologists, but it appeared possible that the greater nervous excitability of the feminine sex might be ascribed to a deficiency in calcium. If the Committee showed a disposition to study its problem in the dry light of science, its recommendations stressed the need for further inquiries rather than the value of results already attained.

It must be remembered that the Consultative Committee was not concerned directly with the question of co-education. Evidence on this question was, however, received, and a digest is given in an appendix. The questions considered refer to the relations between boys and girls in mixed schools—whether, for example, boys tend to take a preponderating part in the social life of the school—the danger of overpressing girls and not pushing boys forward sufficiently, the relative failure to meet the individual needs of some girls, and, finally, staffing difficulties. These last appear to be the most serious, for the position under which mixed schools are, with some exceptions, under the control



of head masters, does not appear to offer a final solution. Women's education has already suffered too much from 'man-made' curricula, and a state of things in which all the responsible appointments in secondary education are held by men would not be acceptable to women under present social and political conditions.

Originally, in Great Britain, as in the United States, the establishment of mixed secondary schools took place without much premeditation. The geographical distribution of these schools in England is curious. Buckinghamshire, Derbyshire, Durham, Gloucestershire, Hampshire, Lancashire, Middlesex, Suffolk, Wiltshire, and the West Riding appear to like mixed schools; Kent, London, Northumberland, Staffordshire, Surrey, and Warwickshire appear not to like them. Lancashire has thirty-three mixed schools and thirty-eight boys' schools under the county authority; London has three mixed schools compared to forty boys' schools. Mr. R. F. Cholmeley, in his chapter on the boys' day school, contributed to "The Schools of England," edited by Prof. Dover Wilson, remarks that the origin of most of these mixed schools is due to convenience, including financial convenience; but he adds that "the interesting thing about them is the growth of a belief in them on educational grounds, and the remarkable success of their work." He regards the growth of the mixed school as one of the most striking developments in day school education. The proportion of mixed schools to boys' schools is almost exactly seven to eight, and the number of boys educated therein as two to five.

If the growth of the mixed school has been without premeditation, the same may be said of the growth of the girls' secondary school and college. The pioneers of women's education saw the nakedness of the land and established new schools and colleges for girls and women, making, at the same time, a reasonable claim to a small share of educational endowments. The University of London was an early convert to *co-examination*, admitting women to all examinations in 1878, with the significant reservation that "no female graduate of the said University shall be a member of Convocation of the said University, unless and until such Convocation shall have passed a resolution that female graduates be admitted to Convocation." Here we see obtruding the old and difficult question of control, a question of much controversy also at Oxford and Cambridge. In London this question has advanced a distinct stage under the new statutes which grant official membership of the Senate to the heads of several women's

colleges, an 'ability' accorded to women which will be generally approved, as it seems desirable to ensure the inclusion of women on the governing bodies of universities.

In the British universities generally, co-education prevails and is unavoidable in the case of subjects studied by a small number of students. Oxford, Cambridge, and London, partly owing to their collegiate organisation, present some special problems.

The question of medical co-education in London has been widely discussed in consequence of the decision of several medical schools in future to exclude women students, a reversal of the policy adopted during the War. The usefulness of the Report of the Committee of the Senate of the University of London on this subject is, however, reduced, because it was not found possible to state specifically the reasons which led the medical schools in question to this decision; nor is there any report by the Faculty of Medicine, the advice of which we should have expected the Senate to seek on constitutional grounds. The committee states: "We are unable to see any valid argument on the merits against the provision of co-education in medicine. The pre-possession of the University is in favour of such co-education." Seeing that a large majority of the existing colleges of the University are unisexual, and that seven medical schools have recently expressed a preference for uni-sexual education, it is difficult to see on what evidence this 'pre-possession' is based. Statistics appended to the Report indicate that there is at present no difficulty in women undergraduates obtaining medical education; for whereas in 1920-21 the London School of Medicine for Women had 447 full-time students, that number had fallen in 1926-27 to 297. The throwing open of the other medical schools to a 'quota' of women would tend to reduce the success and efficiency of this well-organised school for women. Apart from this, is not the 'quota' system inherently objectionable? The University would do well to ensure that all special courses, especially those by research workers at the spear-head of knowledge, should be equally available for men and women. At the moment, no further action on the part of the University appears to be demanded.

Since the publication of the University of London Report, an important opinion on the question of medical co-education has been pronounced by Dr. Louisa Garrett Anderson, who, at a meeting held at the London School of Medicine for Women on Mar. 21, said that a medical school



for women alone had enormous advantages over a co-educational school. Where women held the professorial chairs, she added, women learned to trust women; but where there was co-education it had been found that the most important work was done by men. As the Senate Committee, though in its nature a lay committee, did not attempt to quote expert opinions for and against medical co-education, this professional opinion by a leading woman doctor comes at a convenient moment and should carry great weight.

The general tendency of co-education is towards creating large institutions. Co-educational secondary schools of 5000 pupils are not uncommon in the larger American cities. Co-education also facilitates a preponderance of one sex or the other in the teaching staff, whereas with separate schools there is a natural tendency towards an approximate equality. In some of our co-educational colleges, women do not appear to have obtained a fair proportion of the staff appointments. Nor can co-education offer much encouragement to specialisation on sex lines which may be desirable in certain subjects, *e.g.* medicine. In higher education, which demands consecration and dedication, the presence of the other sex may act as a distraction. Frank R. Arnold, in an article "The Mating Season of Co-education" (*Scribner's Magazine*, June 1926), refers to "co-educational calf-love," and argues that the finest type of woman is not likely to be produced by co-educational institutions. Such women "need years of meditative acquisition, mental brooding as well as physical, and the fault of co-education is that it awakens the mating mother instinct too early."

### The Planetesimal Hypothesis.

*The Two Solar Families: the Sun's Children.* By Prof. Thomas Chrowder Chamberlin. (University of Chicago Science Series.) Pp. xxii + 311. (Chicago: University of Chicago Press; London: Cambridge University Press, 1928.) 12s. 6d. net.

**T**HIS book, which appeared on the author's eighty-fifth birthday, and less than two months before his lamented death, is a summary of the well-known planetesimal hypothesis of the origin of the solar system which, with the collaboration of Prof. F. R. Moulton, he developed during the last thirty years. While the greater part of the book is a restatement of previously published results, some new material is included, and the whole forms a compact and useful account of a hypothesis which, whatever may be its ultimate fate, must take

high rank among the generalisations which have stimulated and elucidated geophysical research during this century.

The "two solar families" are, in broad terms, the planets and the comets. The former class includes the major and minor planets and their satellites, and the latter the chondrules, comets, and meteorites. In "the grey beginning of years," a star passed near the sun, and by tidal action, aided by propulsive forces in the sunspot zones, drew forth a succession of 'bolts' from the near and far sides of the sun. These bolts rapidly cooled and were largely disintegrated into a multitude of 'planetesimals' which, in the course of long ages, were gradually reabsorbed by the residual nuclei of the bolts, forming the planets. The cometary family owed little, if anything, to the passing star. It arose from material ejected from the sun in the manner of the eruptive prominences which are even now frequently observed. The hypothesis is extended in an ingenious way, without excess of purely *ad hoc* assumptions, to explain many details of the present solar system. Prof. Chamberlin's account is not distinguished by marked clearness of expression, but it is in the main free from ambiguity, and the meaning is rarely obscure to the careful reader. A bountiful provision of good diagrams and illustrations, and excellent productive work on the part of the publishers, make up a worthy conclusion to the author's long series of contributions to geology and allied sciences.

The publication of the book has seemed to Prof. Moulton a fitting occasion to direct attention to certain matters connected with the planetesimal hypothesis and its reception among astronomers. He has accordingly issued a pamphlet entitled "The Planetesimal Hypothesis," in which several important points are raised. It is made up of two distinct parts, which may be described succinctly as constructive and destructive. They are not entirely unrelated, for the instruments forged in the former are used as weapons in the latter, and in fact were clearly designed for that end, but the division is nevertheless a convenient one.

In the constructive part a sharp line is drawn between hypotheses of the Laplace type and those of the planetesimal type. "The gap between these different genera of intellectual constructions is as profound as that between different genera of living organisms, and as difficult to bridge." The characteristics of the genera are described by examples instead of specific statements, but it is clear that the typical feature of the former is the idea that the evolution of each cosmic mass is free from extraneous influences and consequently can be traced out rigorously