THE SYMBOLIC STATEMENT OF RELATIONSHIPS

THE simplest way in which to state the relationship of two persons symbolically is to denote each by a number indicating the number of generations since the nearest common ancestor (counting that ancestor as one) and to write the numbers with a sign of relationship between them, that one being placed first whose relationship is to be expressed. A convenient and appropriate symbol of relationship is the ratio sign [:]. Thus the relationship of parent would be 1:2, of child 2:1. Here and elsewhere in this paper a person is regarded as his own ancestor, bearing to himself a relationship of identity [1:1]. The relationship of grandparent would be 1:3, of grandchild, 3:1, of great-grandparent, 1:4, and so on. That of brother or sister would be 2:2, of own-cousin 3:3, of second cousin 4:4, etc., the degree of cousinship being found by subtracting two from the symbol. The relationship of uncle or aunt would be 2:3, of niece or nephew 3:2, of great-uncle or aunt 2:4, and so on. This method also discriminates between relationships for which we have no separate names; thus we speak of a "first cousin once removed," whether we mean the older or younger of the two. The former would be symbolically, 3:4 and the latter 4:3. Likewise a third cousin four times removed would be 5:9 or 9:5. These are evidently as different relationships as parent and child or uncle and niece.

Suppose now we desire to take sex into account, as we do in our names when we distinguish between sister and brother or uncle and aunt. When we do thus distinguish we take account only of the sex of the person whose relationship is being stated. A male person is a brother alike to a male or female child of the same parents. A man is an uncle and a woman an aunt, no matter whether nephews or nieces are in question. In cousinships we do not consider sex at all in naming the relationships. We can do as much as this by attaching a sex initial (M for male and F for female) to the first number in the symbol, thus: 2(M):3 (uncle); 2(F):3 (aunt); 3(M):2 (nephew); 3(F):2 (niece).

But we may go further than our ordinary nomenclature and say 2(M):3(M) (the relation of uncle to nephew), 1(M):3(F) (relation of grandfather to granddaughter), etc.

Furthermore, we may, if desired, substitute for each number a series of sex-initials giving the line of descent in each case, and thus expressing facts that would require many sentences if we were to attempt to put them into words. Thus the following all express the relation of an elder to a younger second cousin once removed, the lines of descent by sex being different in the various cases

MMMM	: MMMMM
MFMF	: MMFFF
FFFM	: FMMMF
etc.	etc.

The first letters, since they denote the common ancestor, will in all cases be the same.

Hitherto no distinction has been made between relationship of the whole or of the half blood. Thus, in the first formula just above the common ancestor is a man, and there is no effort to tell whether or not the descent is through the same or different mothers. If it is desired to emphasize the fact that the relationship is of the whole blood the two letters (MF) may be used together when necessary. Thus, (MF)M:(MF)F is the relationship of own brother and sister, while FM:FF would be that of half brother and sister on the mother's side. Generally it will be necessary to make this distinction only in the case of the common ancestor. Intermarriages in the line, causing double relationships, introduce complexity. The only way to denote these is to make a symbol for each relationship separately and join them by a plus sign. In very complicated cases the symbol ceases to be an abbreviation and the diagram is clearer.

Suppose that a brother and sister marry a brother and sister, so that their children are double cousins. The relationship, if those children are boys, is:

[(MF)MM:(MF)FM] + [(MF)FM:(MF)MM].

Even here, the symbol becomes rather cumbersome, and this is the simplest case of a double relationship.

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SCIENTIFIC BOOKS

Magnetism and Electricity. By Brooks and Poyser. Longmans, Green and Co. Pp. vii + 633; 413 illustrations.

This volume is intended by the authors to replace Poyser's "Advanced Magnetism and Electricity" as the latter book had become out of date owing to the enormous progress made in electrical theory during the last twenty years. The subject-matter is presented in experimental form; practically every point treated theoretically is illustrated by one or more experiments. The method is admirable, especially for a text in physics; as the authors state in the preface, it is important that a beginner should learn to recognize that all theory is based upon a groundwork of experimental fact. The book treats all of the subjects usually found in a text on electricity and magnetism and the treatment is very well done in most cases. The authors' emphasis upon the student's comprehension of the significance of the lines of force of the electric and magnetic field we think well worth while; the more the student is made to understand Faraday's ideas in regard to the electric and magnetic fields the better prepared he will be to understand the operation of instruments and machines.

The modern conception of the electric current as the flow of electrons is used in the book and its use is undoubtedly justified at this time, by the results obtained from the experiments of various researchers along this line. A chapter is devoted to the discharge of electricity through gases; in the discussion use is made of the latest theories in regard to this phenomenon. The chapters on Dynamos and Motors and on Alternating Currents are entirely inadequate to be of much service to the student. We think they should have either been omitted altogether or else treated more comprehensively. Any adequate treatment of dynamos and motors requires a deal of space and should not be attempted in such an elementary text.

A carefully selected list of problems is given at the end of each chapter and it adds much to the value of the book as a text. On the whole we think this text to be as well suited for teaching purposes as any that has recently come to our attention.

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The Life of the Plant. By C. A. Timiriazeff. Translated from the revised and corrected seventh Russian edition by Anna Chereme-teff. New York, Longmans, Green, and Co. 1912. Pp. 355 with 80 text-figures. $2.50.

It is a great pity that this admirable popular presentation of the status of plant physiology might not have appeared in English some twenty-five years ago. Originally published in 1878 and passing through seven editions it can not but strike one familiar with the current literature as being distinctly behind the times, in spite of the evident effort to incorporate various modern investigations. For the specialist the translation has been too long delayed, and even for the general reader there are many views which should be modified in order to give as accurate as possible a notion of what the plant really does. On the other hand, it must be confessed that Professor Timiriazeff has presented the subject in such an attractive form that its very readableness is a strong point in favor of the book. Few of those who have any interest in botany whatever but that will enjoy reading "The Life of the Plant" and the great number of apt illustrations and demonstrations makes one wish that numerous American audiences might have had the opportunity of listening to such a course of lectures thirty-five years ago. The popular conception of a botanist would certainly be higher.

The book is neither a text-book nor a special treatise, but a simple account of the more fundamental life processes of the plant told in a way calculated to make them interesting if not "popular." For this reason it is