AN INTERCHANGEABLE TYPEWRITER

ON page 477 of the May 7, 1926, issue of SCIENCE a correspondent has visions of a typewriter that will be able to reproduce mathematical symbols, exponents, etc., necessitating two shift keys, and suggests that some typewriter company build such a machine.

Perhaps he and other readers have not seen the mathematical Hammond typewriter, holding 120 characters, numbers and letters (capitals and lower case, as on other typewriters), including useful Greek characters. In addition, a variable spacing device may be found very useful for condensed typing.

This make is an interchangeable type machine and changes may be made instantly to others, as foreign language, chemical, medical, by substituting another shuttle. It has been on the market for a very long time (though the mathematical device is comparatively recent) and I believe the Hammond antedates all the present standard makes by many years, an old model having been used personally by Woodrow Wilson as a student and during his presidential term.

FRANK C. PANUSKA

TEACHERS COLLEGE,
COLUMBIA UNIVERSITY

A DENOMINATIONAL COLLEGE AND EVOLUTION

A DENOMINATIONAL college supported by one of our Protestant churches in Texas was in search of a man to fill the chair of biology, and the following correspondence passed between the president and a man holding a Ph.D. degree from the University of Chicago:

My dear Dr. ————:

I have your very kind favor of March 13th. I am glad to hear from you. I have given your application very careful consideration.

I wish information from you on the following: (1) What do you believe and teach in regard to the origin of man? (2) Do you sincerely believe the Old and New Testaments to be the word of God, the only infallible rule of faith and practice? (3) Would you obligate yourself while a member of this faculty not to teach anything that is opposed to any doctrine of the standards of the Presbyterian Church?

The Board of Trustees will require definite answers on these questions before electing any man to the Chair of Biology; therefore it is necessary for us to get very definite information along this line before we can proceed at all.

Hoping to hear from you at your earliest possible convenience, I remain

Yours most cordially,

————, President.

Dear President ————:

My answers to your questions are as follows: No. 1. Being a Christian I can not be true to my belief and not teach the truth as I see it. Being a scientist, with all the evidence at hand, I can not but believe in evolution. Man being an animal is governed by the same physiological laws and environmental stimuli as the lower animals. I can not see how any student of the biological sciences, after making a study of life as exemplified in man and the lower animals with their perfect, delicate structures and wonderful adaptations to their environment, can do otherwise than see in and through it all the directing hand of God.

No. 2. I sincerely believe the Old and New Testaments to be the word of God, the only infallible rule of faith and practice.

No. 3. I would obligate myself while a member of your faculty not to teach anything that is opposed to any doctrine of the standards of the Presbyterian Church.

Sincerely,

————,
Professor of Biology

My dear Dr. ————:

Your favor of March 27th to hand.

I am not sure as to what you really mean in your answer concerning the origin of man; neither do I understand fully and clearly your position on the subject of evolution. I do not know whether you really believe in evolution in the most thorough meaning of the word, or whether you believe more in development.

I do not care to do more than simply get correctly your view of the origin of man and your position on evolution as a theory. If you do not object, I should be glad to have an additional statement from you in regard to this matter. I am willing to say that I have been considering most favorably your application, and want to deal with it with everything clearly before me.

Hoping to hear from you, I remain, with best wishes,

Yours most cordially,

————, President.

Dear President ————:

In answer to your last letter I wish first to say that I am a theistic evolutionist. I believe in evolution as a development, but not as a development produced by chance but by the directing hand of God. I believe that the animals of to-day have been developed by evolution from preexisting, but now extinct, animals and that man is no exception. Therefore, I do not believe that man has evolved from any of the anthropoid apes one sees in our zoological gardens. He has evolved along a line of ancestors predestined to culminate in man as we see him to-day. I do not believe in the theory of "Special Creation."

Sincerely,

————,
Professor of Biology

My dear Dr. ————:

Your very kind favor of April 3 to hand.

I am sorry that your position on the question of evolution is such as to make it impossible for me to recommend you for election to the Chair of Biology. Personally I hold you in high regard.

With very best wishes, I remain,

Yours most cordially,

————, President.

SCIENTIFIC BOOKS

The Biology of Population Growth. By RAYMOND PEARL. Alfred A. Knopf, New York, 1925. pp. 260.

THAT the growth of populations, whether they be of yeast cells, flies, rats or men, has a biological basis is a fact of elementary knowledge, but the essence of Professor Pearl's thesis in his latest contribution is that the *principal* factor in the numerical growth of peoples within modern times is the fundamental biological process of "multiplication of cells by successive division of existing cells."

Present-day discussions of population questions, although usually admitting the soundness of Malthus' arithmetic, have been concerned mainly with various conditions of a more or less temporary character, with the results of man's inventions and "victories over nature," and with the possible influence of "social self-control." Professor Pearl, after long study of the matter from the viewpoint of the biologist, is convinced that these, "the complexities of human behavior, social organization, economic structure and political activity, seem to alter much less than would be expected the results of the operation of those biological forces which basically determine the course of the growth of populations of men, as well as those of yeast cells and . . . flies" (p. 18). In developing his thesis he indulges in no quaint notion of society such as Lester F. Ward propounded a generation ago; society does not have to be regarded as an organism to obey biological laws. "It is the normal natural increase," he says quite simply, "the steady excess of births over deaths—which fundamentally determines the form of the population curve" (p. 18). The proposition that even in such an era as this we can not get away from the most elementary biological fact in accounting for the course of human population challenges keenest interest.

His development of this theme is reading of a fascinating kind. One is loath to attempt to summarize it or to consider it critically in a brief review. For his argument, with a wealth of detail and a refreshing originality of presentation, hangs together so well that it would be unfair to consider it except in its entirety. Only a brief outline is essayed here, with a word or two of comment ventured now and then upon some particular point, as a pardonable reaction to a most stimulating book.

There is general familiarity among students of biology in its broader aspects and of the population question with the previous work of Professor Pearl and his collaborator, Professor Reed, on the mathematical expression of the course of population growth by the curve of the general type—

$$y = d + \frac{k}{1 + e^{a_1 x + a_2 x^2 + a_3 x^3 \ldots a_n x^n}}$$

which is commonly referred to as the logistic or "growth" curve. In the present treatise these earlier studies are reviewed and somewhat amplified, particularly on *drosophila* and human populations. Probably the most interesting addendum is that in which he makes use of the vital statistics of the indigenous native population of Algeria. In this instance he believes he has found a human population "which has in the 75 years of recorded census history practically completed a cycle of growth along the logistic curve" (p. 208). The data relating to the Algerian instance are considered *in extenso* and can not be summarized here, but its chief significance, as Professor Pearl points out, lies in the facts that during this period the trend of the birth-rate was unaffected by contraceptive methods, and that the death-rate was unaffected by public health measures. The recorded census histories of other peoples, although some of them cover a longer period of time, yielded only fragments of the curve of growth; here, apparently, was one so nearly complete that it could be used as a fairly good demonstration of the human fitness, as it were, of the mathematical expression. There will be no lack of sympathy with the author in the difficulties of his search for census materials of the kind that he needs for his purpose, since dependable enumerations obtained at regular intervals over a long enough period are hard to find. He has undoubtedly done the best that can be done with the Algerian records, and I confess an envy of his ingenuity in dealing with rather unsatisfactory material, for it is not as satisfactory as could be desired. The impression left is not wholly convincing, so far as the indigenous natives of Algeria are concerned, not only because of the material but also because one wonders how, even if birth and death rates were left untampered with, so complete a cycle of population growth could have been accomplished in so short a time as seventy-five years in any human population. At least, this point does not seem to have been made perfectly clear to the non-biological reader. This, in the light of the manifestly important considerations