viruses affect metabolism and cause disease. Stanley gives a restrained discussion of the possible relationship of viruses to cancers.

Pros and Cons of Success

How successful is this venture into multiple publication? Speaking generally, I think the result is good and sets an example that could well be followed by other laboratories, to the benefit of both science and the public. The stature of the participants vouchsafes the accuracy of the presentations; interest and clarity are high throughout. Without tendering more well-earned praise, let me now offer a few adverse criticisms, on the assumption that the example here set will be followed by other laboratories, which will not want to make the same mistakes.

The principal shortcoming of the book is what one would expect of a work written by many busy men: looseness and repetition. The word *plaque*, for instance, is defined on page 80 and again on page 115. On page 124 we are informed that "more than 200 previously unknown viruses causing disease in man have been discovered since 1955 . . ." only to be told the same thing again 18 pages later. The organization and writing is somehow unliterary (or unbooklike, at least) and reveals its "stagey" origin. It reads in places almost like a TV script, which some readers will no doubt find annoying. On the other hand, this same origin is no doubt responsible for the unusually close and beautiful integration of text and illustrations, which can stand as a model of excellence. In sum, the shortcomings are minor, and the book can be warmly recommended to intelligent laymen, to high school students, and to both students and faculty, at the college level, who are not in close contact with research in molecular biology.

Evaluating the films is a bit more difficult, because of my uncertainty about their intended use. For TV, one should highly recommend them as a great improvement on the bulk of television fare. Even so, the films have their weak points. The exhibition of the giant models is repeated in more than half the films, and we are told repeatedly that, on this scale, the whole TMV molecule would be six stories high. Once, or possibly twice, would surely be enough. Some anemic chamber music is used as a background theme for the beginning and the end of all eight films. I found this music positively allergenic, and $2 \times 8 = 16$. Some of the art work is quite poor. That the dog in the first film appears to have been drawn by James Thurber at the age of four may not matter much, because everyone knows what a dog looks like; but the diatom is another matter. In the fifth film the animations of the assimilation of food by a cell will surely lead to misconceptions. Admittedly, good animations are expensive; but they should be done well or not at all.

The films were made initially for TV. Are they satisfactory for the college classroom? Yes; but they need further editing. Such statements as "Last week you saw . . ." are out of place here. And the opening few minutes of all but the first film should be deleted to minimize repetition. There is great variation in the stage competence of the speakers, but this is not entirely a shortcoming. Some awkwardness conveys an air of authenticity. The individuality of attire (coats, lab coats, and shirt sleeves) also says, "These are the men who did the work, not actors." That's good.

Probably not many institutions will care to use all eight films, but two at least should see wide use: No. 2, which shows the basic physical procedures involved in virus study, and No. 8 (on cancer), which ends dramatically with a listing of unanswered questions.

Stanley and his group at the Virus Laboratory deserve praise for so ably making their findings available to other scientists and to the general public. Let us hope that other laboratories follow their lead—and that they do even better.

Garbled Information

Human Heredity. Jean Rostand. Translated by Wade Baskin. Philosophical Library, New York, 1961. 139 pp. $4.75.

For a small book, this one packs a powerful lot of misinformation and misconception. Responsibility must rest mainly with the author, but to some extent it also rests with the translator, Wade Baskin of Southwestern State College, and with the publisher, the Philosophical Library, whose bad judgment it was to produce an English edition. The book appeared as *L'Hérédité humaine* in Paris in 1952. Between 1952 and 1961 the field of human genetics advanced perhaps as much as during all the period prior to 1952. Some of the misinformation arises from failure of the translation to take account of the advances of the last decade, but other misinformation and most of the misconception had no excuse for their existence even in the original book in 1952. It is interesting to contrast this with Penrose's beautiful little *Outline of Human Genetics* (1959). Rostand's book falls short of its avowed objective: "to introduce the greatest number of people into the sovereign dignity of knowledge." Penrose's fulfills this purpose quite satisfactorily.

Beginning on page 14 where it is stated (and it is later repeated many times) that the chromosome number of man is 48, misinformation piles up in great mounds. Inadequate compensation is provided by the translator in fine print in the appendix: "It has recently been established that there are only forty-six chromosomes." Several times serious reservations are raised, and discussed at some length, concerning the existence of the Y chromosome in man. The reader is told that the founder of modern genetics was Johann Mendel—correct since the full name was Johann Gregor Mendel, but certainly unusual.

Men with many daughters will be intuitively suspicious of the view repeated on page 126 that "there is probably a correlation between the tendency to produce boys and the virility of the father." On page 132 we read "out of ten stillborn children, three are victims of maternal syphilis" —a statement which simply is not true and probably never has been, at least not in recent decades. Historical and genetic information alike are garbled on page 78 where the now famous story of Queen Victoria's transmitting hemophilia is related. "Victoria received it from her mother, who had received it from her mother." Haldane has investigated the matter most closely and thinks there is no evidence that the gene existed in the lineage before Victoria and that she was a carrier by virtue of new mutation. "Victoria's husband, Prince Albert of Saxe-Coburg-Gotha belonged to a progeny of carriers, though he himself was probably illegitimate." Irrelevant and probably untrue!

The grossest misconception conveyed by this and unfortunately by several other popular and semipopular

presentations of human genetics, some of them written much more recently, is that the inheritance of eye color, hair color, form, and any number of other normal and disease traits is a simple matter of Mendelism. For example, long lists are provided with these traits arranged down the pages in columns according to whether they are dominant or recessive. The inheritance of none of the traits, particularly the "normal" ones, is all that simple. In connection with rare hereditary disease traits, such treatment misses an important concept of medical genetics, namely, the heterogeneity of entities which phenotypically appear to be homogeneous.

The author, a biologist, is the son of Edmond Rostand (1869–1918), creator of *Cyrano de Bergerac,* and the brother of Maurice Rostand, also a dramatist.

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La Vie

Encyclopédie Française. vol. 4, pt. 1 and pt. 2, *La Vie*. Fondement, maintien, réproduction. Pierre-P. Grassé, Ed. Société Nouvelle de l'Encyclopédie Française. Larousse, Paris, 1960. x + 710 pp. Illus. + plates.

Seventy of France's distinguished scientists participated in the writing of this book. They have avoided an encyclopedic collection of fragments and have produced an organized, logical account of biology.

La Vie is composed of nine sections, each with a number of chapters (the number is indicated in parentheses). Origin and Place of Life (2) discusses theories of the origin of life, physical functions of living matter, and geobiochemical cycles of carbon, nitrogen, and other elements. Physical Structure and Chemical Composition (4) considers, among other topics, colloidal state, water absorption, birefringence, macromolecules in protoplasm, energy transfer, and the chief chemical constituents of living things. Organization of Living Beings (7) deals concisely with the cell concept, bacterial morphology and sexuality, viruses, cytology of the animal cell, the multicellular state and cellular differentiation, and cytology of the plant cell. Cellular Activities (7) is devoted to several subjects of general physiology such as ameboid and muscular movement, cell permeability, water and ion exchange in plant cells, enzyme action, processes of synthesis and degradation, and the relation of physicochemical laws to cell activities. Maintenance in Animals (11) and Physiological Equilibrium (6) review, essentially at the organismal level, the comparative physiology and biochemistry of the principal physiological processes and such other topics as production of light and electricity, immune reactions, wound healing, animal grafts, and tissue culture. Behavior (11) deals with sensory information, the nervous system, the nerve impulse, simple reflex and higher nervous activity, sleep and rhythmic activities, tropisms and reflexes, instinct, intelligence, and social phenomena. Maintenance in Plants (9) is a section on plant physiology with consideration of structural and functional diversity, energy sources, plant anatomy and organogeny, synthetic processes, mineral metabolism, physiological regulation, growth and morphogenesis, movements and tropisms, and reactions to environmental factors. The book ends with the section Transmission of Life (6) in which are discussed sexual and asexual reproduction, animal ontogeny, growth, senescence and death, plant reproduction, and heredity.

Many line drawings illustrate the text. The 32 plates contain 90 figures; 35 of these are photographs, predominantly of protozoan, invertebrate, and plant forms, taken through the electron microscope.

One appendix consists of bibliographic references grouped by chapter headings; another contains brief academic *vitae* of the contributors. There are 30 pages of subject index. Both appendixes and the subject index are duplicated in each volume.

My initial apprehension, caused by a dust jacket claim that the use of too technical terms had been banned, was allayed by reading a few selected chapters. The book is no mere popularization of biological principles. *La Vie* aims at an explanation of laws regulating living organisms; its approach is largely that of molecular biology. In a foreword Gaston Berger phrases this astutely, if perhaps idealistically: "The chemist, studying the reactions that operate in an organism, devotes himself to following molecules, atoms and particles through the various systems in which they participate. The biologist, studying the same processes, endeavors to discover how organization results from the elements, function from the reactions."

Striking changes in the introductory biology courses of many colleges will soon be necessary as a result of the national efforts to improve biology teaching in secondary schools. A judiciously edited translation of *La Vie* could be a model in planning and organizing an undergraduate course for students who come with the new secondary school preparation in biology and chemistry.

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Ineffective Committees

Biological Education in American Secondary Schools, 1890–1960. Biological Sciences Curriculum Study Bulletin No. 1. Paul DeHart Hurd. American Institute of Biological Sciences, Washington, D.C., 1961. x + 263 pp. $4.75.

In this book Hurd reviews biology teaching in American secondary schools from 1890 to 1960. The book consists of two parts: reports of various curriculum committees and reports of research studies.

Part 1 consists of recommendations from 84 biology curriculum committees plus the author's explanatory comments. The 70-year period is divided into the seven decades, and a chapter is devoted to each.

Presumably the reports of the various committees were intended to improve biology teaching. However, little evidence is presented to show that they have had much effect. Hurd writes: "There is no real way to judge the extent to which the biology curriculum committees . . . were effective in bringing about change in either the content or conduct of biology courses. It is apparent that the ideas for improvement of biology teaching being discussed today are quite similar to many of those suggested before the turn of the century."

Why, then, was so much of the book devoted to useless reports? Perhaps the author thought a demonstration of past ineffectiveness would secure the efforts of future committees, for he also writes: "An analysis of the factors involved in getting curriculum reforms into the