

variations in tribal culture," stated on the grounds that such adaptation would limit the comparability of results obtained in different regions. For it is these very considerations that may be responsible for departures of future population trends from those expected from the present analyses. By the use of such material one may hope to pursue further "a rather strong suspicion of some differential under-enumeration by age," and not only to demonstrate that this occurred but also to measure its incidence and magnitude—a task which is

regarded (p. 274) as "near impossible." Demographers are aware of the earlier local surveys—Kuczynski's demographic survey volumes on Africa intensively reviewed those carried out before the 1939–1945 war. A similar compilation and further analysis of the more recent material would be a worthwhile, indeed will be a necessary, companion to this volume.

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What Do We Do to Adolescence?

Society's Children. A Study of Ressentiment in the Secondary School. CARL NORDSTROM, EDGAR Z. FRIEDENBERG, and HILARY A. GOLD. Random House, New York, 1968. xii + 209 pp. \$4.95.

"Donkin felt vaguely like a blind man feeling in his darkness the fatal antagonism of all the surrounding existences, that to him shall forever remain unrealizable, unseen and enviable. He had a desire to assert his importance, to break, to crush; to be even with everybody for everything; to tear the veil, unmask, expose, leave no refuge—a perfidious desire of truthfulness."

Thus Joseph Conrad describes a character in terms that suggest the quality of "ressentiment" described in the writings of Scheler and Nietzsche and in this short volume. Ressentiment emerges as a secret, unconscious, unfocused tension felt in members of a group who vaguely sense their own impotence and whose rage is contained by a transformation of their inadequacy into a virtue. The resentient man is the self-righteously weak-willed, the sick-souled, the nay-sayer, the man in bondage to a slave morality; Donkin, Uriah Heep, Smerdyakoff—literature and life abound with such individuals.

It is, however, in its institutionalized form that ressentiment may do its most subtle and devastating damage. The classic study of the phenomenon in its social context (unfortunately ignored by the authors of this book) is *Moral Indignation and Middle Class Psychology* (1964) by the Danish sociologist Svend Ranulf. *Society's Children* is an attempt to identify, measure, and determine the effects of ressentiment in some American high schools.

The authors' interest in this phenomenon grew out of previous studies

of college students who began as science majors but then dropped science. They found a peculiar built-in selection and de-selection process going on among students of the natural sciences wherein the most dutiful, uncritical, and conforming students—whom the authors call "conventionals"—stayed in science and got good grades, whereas the more inquiring, skeptical, adventurous, and intellectually restless students—designated as "adolescents" (how refreshing to see this word used in a nonpejorative sense!)—tended to drop out of science. The conclusion troubled the authors (as it should trouble us) because, if this process continues, science will more and more include cadres of smug technologists preoccupied with technical problems, their personal daemons and spirit of inquiry smothered by a need for organizational approval. Aren't we, in fact, even now uneasy over the delivery of science into the hands of plodding mechanics whose attention can be absorbed by biological warfare and weapons delivery systems and whose social consciences are quieted by institutional rhetoric and unexamined righteousness?

In the work described in the book under review, the investigators studied nine high schools, focusing on a random sample of students and teachers and on the rules as articulated by handbooks and administrators, to determine to what extent ressentiment was present and whether it seemed to mold "adolescents" into "conventionals." The schools represented a broad range of social, ethnic, and religious classifications. A number of tests were developed and used to provide a "ressentiment index" of the institution and the responsiveness of its students. Unstruc-

tured but guided interviews were used to determine how the "institutional press" of the school was mediated by its teachers and how the aspirations and frustrations of the students fit or deviated from the expectations around them.

A well-designed and well-described social science investigation can illuminate much of our world even if its hypotheses are not validated. The nine schools were found to differ in their resentment indices, and these measures did approximately vary with social class; but it could not be determined that the greater the measure of resentment in the school the higher the incidence of "conventionalism" among the students. There was no clustering of "adolescents," only a depressing and overwhelming smear of conventionality that cut across any discernible differences between the schools. The sanctions of the higher-class schools were more subtle, but their concern with "propriety" was every bit as stultifying of individuality as the preoccupation of the lower-class schools with "obedience."

There is something in the institution of secondary education itself, regardless of its variety, that provokes or sustains or exploits the conformistic impulses of its charges. And perhaps the impulses themselves are too strongly fashioned by a larger society that derogates adolescence at the same time that it prolongs it.

This book represents a beginning of a line of inquiry about American education that had better become a major order of business. It is urgent reading for educators. The style is light, and every once in a while the prose is rewarding. The biases of the authors are open, accounted for, and very welcome.

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Estuary Life

The Biology of Estuarine Animals. J. GREEN. University of Washington Press, Seattle, 1968. x + 401 pp., illus. \$9.50.

Any author who can condense knowledge of the entire realm of estuaries and their fauna and flora into one readable book deserves to be commended. J. Green has done this, and,

although certain aspects have of necessity been considered only superficially, most of the major subjects have been given sufficient consideration to permit the reader to obtain more detailed information with the use of the ample bibliography. Proceeding from a definition and consideration of the structure and chemistry of estuaries, Green moves on to encompass most aspects of the life history of estuarine animals and plants. Although a different organization might have been preferable, his treatment of plankton, macrobenthos, microbenthos, the freshwater component, the terrestrial component, estuarine fish, estuarine birds, and estuarine parasites does follow an orderly progression. The examples are taken from studies of estuaries throughout the world and usually from relatively recent research, although in some cases an earlier, classic work is used as the reference. The diagrams and figures, many of which are original, are well done and

carefully selected to convey the points under discussion. There is a reasonable balance between field observations and experimental studies, although in certain cases one would have hoped for a greater emphasis on certain physiological aspects. The only part of the book which might have been improved by greater attention is the index. Although the indexing of authors' names and scientific names is more than adequate, many subject headings have been omitted. For example, in spite of the treatment which the text gives to the general subject of ionic regulation and osmoregulation, these headings are not included in the index. The book can be highly recommended to undergraduate students who are seeking a general introduction to estuaries, their fauna, and the unique aspects of these highly productive portions of the sea.

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Connections in the Nervous System

Interneurons. Their Origin, Action, Specificity, Growth, and Plasticity. G. ADRIAN HORRIDGE. Freeman, San Francisco, 1968. xxiii + 436 pp., illus. \$12.50. A Series of Books in Biology.

Adrian Horridge, who previously co-authored *Structure and Function in the Nervous Systems of Invertebrates* with T. H. Bullock, wrote this book with three stated purposes in mind: to update the first nine chapters of *Structure and Function*; to describe the evolution of behavior through the evolution of neuronal connectivity patterns; and to develop a general description of the properties of interneurons by using a variety of examples from the nervous systems of different animals. Each of these tasks is large, and the attempt to deal with all three in one format has resulted in a broad but uneven book. This fault is regrettable, because some sections of this book are good and would stand better alone.

For example, the early chapters on the evolution of connectivity patterns in lower forms, although not sufficiently detailed to update the scholarly *Structure and Function*, are nonetheless delightfully informative. Exercising both a fine grasp of detail and perspective, Horridge traces the development of cellular communication from intracellular controls in protozoa to the inter-

cellular conduction in non-nervous (ciliary) cells and in nervous nets in simple metazoa. Particularly interesting is the suggestion that one of the early functions of the nerve net is to inhibit the endogenous pacemaker activity of the non-nervous ciliary cells. Horridge next considers the rules of neuronal connectivity that are essential for development of higher central nervous systems and suggests that they can first be recognized in jellyfish and certain swimming anemones in which two independent nerve nets coexist. One nerve net is concerned with the coordination of symmetrical swimming movements, the other with coexisting behaviors such as feeding. The basic rule is: specificity. Each neuron must connect only with neurons of its own net; it cannot indiscriminately synapse with any neuron it encounters.

Horridge next takes up synaptic transmission and the cellular properties of more highly differentiated nervous systems. Here Horridge seems on less familiar ground, and he begins this section on a biased note ("a thorough knowledge of the ionic nature of the membrane currents or of the biophysical features that make neuron membranes excitable is of little help in explaining how neurons coordinate behavior") and runs speedily on.

Horridge goes on to describe well-differentiated ganglia and central nervous systems. Using the cardiac ganglion of crustacea as a transitional example, he considers in turn the ganglia of the annelid CNS (discussing variations in the giant fiber systems), the ladderlike cords of arthropods, and the vertebrate sensory systems. There are additional chapters on the development of neuronal connections and on learning. The section on learning, an area to which Horridge has himself contributed importantly, is particularly valuable.

The last two chapters are on features common to interneurons and on limitations inherent in interneuron studies. These chapters are essentially collections of aphorisms and they highlight the weaknesses of the book. One weakness is the repeated attempt to describe the properties of interneurons as if they were a specific class of cells whose properties were so well understood and distinctive that they could be clearly distinguished from other neurons. Actually, the biophysical properties of all neurons are remarkably alike, not only in different regions of the same brain but even in different brains. What distinguishes interneurons from each other and from motor and sensory cells is the way they are interconnected, and this will of course vary greatly from region to region and from brain to brain. It is therefore possible and even profitable to speak of interneurons in a restricted and specific sense and to examine the functional differences between a monosynaptic reflex, where sensory neurons synapse directly on motoneurons, and a polysynaptic reflex, in which a number of interneurons are interposed between the input and output neurons. Here one compares two anatomically distinct connectivity patterns to see what interneurons add to the dispersion and transformation of neural activity and to the generation of reflex behavior. By contrast, it is difficult to describe the properties of interneurons in a general sense, because the term thus used refers to all neurons in the brain which are neither primary sensory nor primary motor, and the interconnections of most neurons in most brains cannot as yet be specified.

Horridge unfortunately assumes as his task the description of interneurons in the general sense. He manages well in systems where the available anatomical and physiological knowledge is sufficiently detailed to encourage reasonable guesses as to how neural informa-