is inclined to lay too much to what he calls our "populistic tradition." In my judgment there is at least one other factor of critical importance.

An obsessive fear of both privacy and secrecy may develop in a society whose population is composed of heterogeneous and mutually hostile racial, nationality, ethnic, religious, or political elements. The English can afford to be indulgent of those who differ or dissent, or who insist that their private affairs are no concern of the state or public opinion. As Shils observes, "Mutual trust (in Britain) reduces the fear of secretiveness and the need for publicity." In America, however, the same influences that operate to create attitudes of freedom and toleration toward differences—that is, a heterogeneous population in an extensive land, operate also to produce fear of diversity, especially when these differences take, or appear to take, a political turn. The American knows well that in a nation composed of men and women of nearly every conceivable national, racial, or religious heritage, toleration of religious and cultural differences is a condition of survival. Otherwise we might quickly revert to that state of nature of which Hobbes spoke. But the limits of this toleration, although vague and variable, are nevertheless real, particularly when political values are involved.

Without a common culture, with historical, religious, and literary traditions as diverse as the groups entering into the so-called "melting pot," and to a large extent lacking even a common language, the nascent Americans looked for a common bond of unity in the political and economic institutions of their adopted land.

The very differences that produced a tradition of toleration on the cultural level produced an equally fanatical belief in the necessity for conformity in political and economic ideas. Hence, the passion for Americanization, for loud and repeated affirmation of devotion to the Constitution, the Declaration of Independence, Free Enterprise, and other signs and symbols of a common political and economic loyalty. It is a loyalty, be it noted, not to any omnipotent state of Hegelian or Marxist hue, but rather to a set of political ideas that give meaning to our kind of heterogeneous, pluralistic society. Among these is the notion that publicity is a safeguard if not a cure for most political ills. Hence, state secrets too are anathema.

Yet when state secrets are associated with national security and the defense of other democratic values they join the Constitution, the Declaration of Independence, and other symbols of our common political heritage as part of the "ceremonial of solidarity" so important to a heterogeneous, pluralistic people.

No brief review can summarize this searching and stimulating volume. Nowhere have I seen so impressive an analysis of one of the major problems of our time. Shils is no zealot, either of the right or left. He recognizes that in the context of polarized political power a security problem of considerable dimensions confronts all the free nations. His quarrel is with those methods that not only are ineffective in promoting security but actually impair national security by undermining those features of our pluralistic society upon which our national security most depends. His concern is not with security or even with secrecy as such, but with *The Torment of Secrecy.*

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Protoplasmatologia. Handbuch der Protoplasmaforschung. vol. II. *The pH of Plant Cells.* James Small. *The pH of Animal Cells.* Floyd J. Wiercinski. Springer, Vienna, 1955. 116 pp; 56 pp. $8.10.

As introduction to the *p*H in plant cells, a brief history is given of early estimations of *p*H values in plant cells as well as an outline of Small's Range Indicator Method. This method (R.I.M.) was largely used to obtain the data on which the monograph is based. Tables of indicators and of color changes for rough practical estimations and an outline of new notation for R.I.M. follow. The present-day outlook on *p*H and the R.I.M. is discussed, and significant precautions, advantages, and limitations of the method are pointed out. In the succeeding section the relationships between *p*H and natural indicators are reviewed.

The following major chapter comprises methods and data on the *p*H of plant cell sap. Significant results and *p*H ranges are assembled here according to taxonomic groups, together with a detailed listing of varied tissue locations in angiosperms and of cell and tissue distribution within the plant. Varied conditions are also taken into account, such as flowering and vegetative state, maturation, seasonal changes, gradients, diurnal variations in succulents, nonsucculents, and stomatal guard cells, effects of plant hormones and chlorosis on *p*H. One chapter deals with the plant cell wall, buffers in plant cells, and the protoplast including nucleus, chromosomes, chloroplasts, granules, and limiting layer. These sections are relatively short, since considerably less is known here. The bibliography contains 230 full citations.

The purpose of Wiercinski's review is to evaluate all the existing literature and data on *p*H in the protoplasm of animal cells. In his presentation of modern problems, methods, and results, the author is mindful of the fact that in the past faulty methods and techniques have been common sources of error. Both the methods and the assumptions on which their procedures are based are therefore carefully examined.

Detailed discussions are given in three sections on the methods used for the determination of intracellular and tissue *p*H: namely (i) potentiometric methods (hydrogen, platinum, and antimony electrodes; capillary glass electrode; glass electrode); (ii) indicator method (general considerations; vital dyes; acid-base indicators; natural indicators in living cells); and (iii) methods of calculation (Henderson-Hasselbalch equation; zeta potential; buffering power). The actual data are subsequently given in tables systematically from the Protozoa through the Chordata.

In lieu of a summary the author presents a critical discussion of data for *p*H obtained by different workers, in nucleus, cytoplasm, and vacuole. He concludes that only a few investigators have in the past entirely excluded possible errors involved in the methods used, although it would certainly be incorrect to assume that all cells have the same *p*H at all times.

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Advances in Carbohydrate Chemistry. vol. 10. Melville L. Wolfrom and R. Stuart Tipson, Eds. Academic Press, New York, 1955. xx + 437 pp. Illus. $10.50.

The technical stature of this series of *Advances* is outstanding, and volume 10 is one of the best. Determination of the true value of these volumes is hardly possible, but it is obviously very great. If the present apparently high editorial standards are maintained, carbohydrate chemists can be assured that developments pertinent to their major scientific interests will be continuously reorganized in the light of current needs.

Contributions from 11 well-qualified scientists (one each from Australia, Canada, and Scotland in addition to four each from England and the United States) treat nine subject headings. Because of the detailed exactitude with which each section is handled, perhaps several reviewers rather than a single one would have been more in keeping with the tenor of the work.

"The stereochemistry of cyclic derivatives of carbohydrates" is discussed (J. A. Mills) from a fresh point of view which ultimately should be helpful in

picturing the necessarily complex polycyclic structures encountered by all carbohydrate chemists. Current practices leave much to be desired, and this survey, prepared in the light of terpene and steroid experience, suggests a reasonable approach.

Chromatographic techniques will long retain a position of singular importance. Thus, it is appropriate that the paper chromatography discussion in volume 9 has been followed by one on column chromatography (W. W. Brinkley) in volume 10. Both discussions are excellent. It is indeed fortunate that these literature studies are being provided during this critical period of rapid extension of the principle.

Many of the nitrogen-containing derivatives of sugars and the reactions leading thereto have been surveyed under the headings "Glycosylamines" (G. P. Ellis and John Honeyman) and "The Amadori rearrangement" (John E. Hodge). Although they have long been recognized as being biologically significant, there is still much to be explained in the chemistry of these compounds. These current compilations will be used for a long time by all who work with these difficult and often baffling reactions.

Traditionally, glycosyl halides in the acetylated form are key compounds for the preparation of glycoside derivatives. Being essential for the preparation of many complex derivatives, a study (L. J. Haynes and F. H. Newth) of this group is welcome. Several pages of tabulations of physical constants of glycosyl halides and their derivatives will make the section additionally useful for laboratories with limited library facilities. The same is true for extensive tables of constants (George G. Maher) reported for the methyl ethers of aldopentoses, rhamnose, fucose, and D-galactose.

Polysaccharides associated with cellulose in most of its native forms are diverse in composition and structure. Results from work on these compounds are somewhat obscured in some cases because of the relatively severe treatments to which the original wood was exposed. However, the significant literature has now been reviewed (W. J. Polglase) and organized in a meaningful manner. The question of retention of native qualities has also plagued heparin research, but a survey (A. B. Foster and A. J. Huggard) of recent work indicates that very substantial progress has been made in the study of this biologically important polysaccharide material.

Volume 10 has every right to take its place alongside the earlier members of this series as a near essential for all carbohydrate chemists.

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Atom und Psyche. Ein Deutungsversuch. Egon Freiherr von Eickstedt. Ferdinand Enke, Stuttgart, 1954. 158 pp. Cloth, DM. 14.20; paper, DM. 12.

Die Selbstgestaltung des Lebendigen. Synoptische Theorie des Lebens als ein Beitrag zu den philosophischen Grundlagen der Naturwissenschaft. Karl Friederichs. Ernst Reinhardt, Muenchen–Basel, 1955. 222 pp. Cloth, Fr. 20.50; paper, Fr. 18.

These two volumes can appropriately be reviewed together, not only because they belong to the line of German *Naturphilosophie,* but also because their intention and viewpoints are similar. Both start with the theory of levels or the hierarchy of reality, as was advanced, in Germany, particularly by Nicolai Hartmann. Both try to fit together these eternal antagonists in the world drama, body and mind, conceiving of physical matter, organism, soul, and spirit as layers in the great cake of reality, and arriving at a psychicist interpretation similar to that advocated by Sinnott in this country. For the philosophically minded, they will make interesting reading.

Von Eickstedt, the distinguished anthropologist, travels from the subatomic territory via the hierarchy of biological systems to mental phenomena. The elementary units of physics being at the basis of reality, the question is raised whether the psyche also comes in, and concordances may be found between the atomic world of microphysics and the properties of living and animate nature. In fact, many such parallels show up. Behavior at the microphysical level compares to vital rather than to macrophysical phenomena. The elementary processes in physics are beyond space, time, and substance which are only categories of human experience; likewise, the familiar categories of space, time and substance dissolve in narcosis, under mescaline or after traumatic lesions. Microphysics is governed by statistical laws where the individual particle has a "choice" between different possibilities, just as the human individual follows his "free will" and, nevertheless, a statistical law allows us to predict quite exactly the number of suicides in years to come. Amplification of microevents to macrophenomena seems to play a role in biological happenings, as, according to the target theory, one quantum "hit" suffices to produce a mutation, and so forth.

Friederichs, noted for his contributions in the field of applied entomology, calls his theory "autotelism." While giving credit to the approaches made toward teleology by organismic biology, general system theory, cybernetics and cognate approaches, and acknowledging that, according to my own writings, many apparently vitalistic features of the organisms can be conceived as consequences of their being open systems and steady states, he finds these conceptions shortcoming in view of the *Sinnhaftigkeit* and *Innen* of the organism. The essential limitation of the concept of wholeness is to skip the unspatial component of the organism that has a decisive influence on vital happenings.

Since the success of some 2000 years of philosophy has been indifferent in putting together the physical and psychical halves of the great Humpty Dumpty, no blame can be laid on the erudite authors for not having provided the final solution. We do not judge whether, according to Friederichs, the psychophysical union can be compared to the spatio-temporal union of physics, whether speaking of physical, biological, psychological, and cultural "levels," does not involve a μετάβασις εις ἄλλο γένος, in how far Eickstedt's parallel between microphysical and psychological happenings is permissible, and so forth. Perhaps the wisest attitude is indicated by Friederichs who, laudatorily commenting on certain statements of the reviewer, says that the latter "appears in Faraday's position when he was asked what electricity is. His answer: 25 years ago I could have told you, but I cannot today."

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Realms of Water. P. H. Kuenen. Revised version translated by May Hollander. Wiley, New York; Cleaver-Hume, London, 1955. 327 pp. Illus. + plates. $6.50. (Originally published as *De Kringloop Van Het Water.*)

The demands for more and more water that society is making upon science and technology become more pressing with each new day. The increasing industrialization throughout the world, coupled with the unrelenting rise in populations, requires a continuing assessment of our water resources. In order to appraise significantly the world supplies of this precious commodity, we must be aware not only of its distribution over the crust of the earth but also of its travels. P. H. Kuenen has compiled in this new book much of the necessary background information for these problems.

The book treats the journeys of water from its principal reservoir, the oceans, through the atmosphere, glaciers, terrestrial waters, and ground waters, and finally through the rivers back to the oceans. The physical and chemical interactions between water and its various temporary environments are emphasized. Somewhat neglected, however, are the chemical isotopic compositions of natu-