Letters

Under Secretary of Commerce for Transportation

In your issue of 26 December 1958 there is an editorial concerning the report of the Bureau of Standards on a battery additive. Referring to a resolution introduced by Representative John J. Allen, Jr., of California, now Under Secretary of Commerce for Transportation, the editorial notes that if Allen's appointment is confirmed he "will be in a sense in the unusual position of being simultaneously plaintiff and defendant."

In fairness to Under Secretary Allen, you should know that his duties as Under Secretary of Commerce for Transportation do not include supervision of the Bureau of Standards. Allen's statement on behalf of the resolution which he introduced in 1957 reads, in part, as follows:

"Under the circumstances, and without having any opinion as to the merits of the further claims of the claimants nor the amount thereof, I felt that the claimants should have a day in court in which they could be fully heard . . ."

It might also interest you to know that in March of 1953 when the director of the Bureau of Standards, Allen V. Astin, had been requested to resign because of his findings in the case of the Battery Additive AD-X2, I intervened with Secretary of Commerce Sinclair Weeks in Astin's behalf and the Secretary reversed the position which had been taken by the department with respect to Astin.

LEWIS STRAUSS
U.S. Department of Commerce, Washington, D.C.

I am glad to have the record set straight. When I was checking on the facts for the editorial, I telephoned the public information office of the Department of Commerce and the White House news office. In both instances, I asked whether it was true that the President had announced his intention to appoint John J. Allen, Jr., to the post of Under Secretary of Commerce; the reply from each was, "Yes." Since neither office knew to what use I wished to put the information, it is understandable that they did not give the full title.—G. DuS.

History of Public Health

My attention has been called to a review of my book, *A History of Public Health*, in *Science* [**128**, 1080 (1958)]. While the lengthy review by Leland W. Parr is highly complimentary, it does contain a specific misstatement of fact that I wish to correct, as well as a comment that should be placed in proper perspective in order to guard against misinterpretation.

Parr's statement that I make no mention of toxoid is untrue. He refers specifically to diphtheria, and how he could have missed this is not clear to me. The development of diphtheria immunization is discussed on pages 336 to 338. On page 337, after mention of Ramon's development of anatoxin (toxoid), there is a specific statement that "later, alum-precipitated toxoid was found to have still greater antigenic potency." Discussion of the application and consequences of preventive immunization in diphtheria follow. Diphtheria is used as an example of the consequences of the bacteriological discoveries.

The second item concerns Table III, a listing of certain disease organisms discovered between 1880 and 1898. Parr comments: "I do not see why the anthrax bacillus (1876, Koch) was not included, since it was in a way the fuse that touched off the era, and for that matter the gonococcus, the meningococcus, and the organisms that cause whooping cough, tularemia, relapsing fever, and syphilis might well have been included because of their importance." As Parr himself is aware, the table covers only the last two decades of the 19th century and lists organisms discovered during this period. Koch's work on anthrax is considered extensively on pages 312 to 314, immediately preceding Table III. Mention is also made of the gonococcus, which was discovered in 1879, and of the organism of relapsing fever (1868–1873). Within the context, the story is clear to any reader who pays attention to the text, for which the table is only an illustration.

It should be clear that this is a history of community action in the interest of health and not a history of bacteriology and immunology, the latter subject having been dealt with fully by Bulloch. The selection of data will of course differ with the person who writes a book. I believe that the argument of the book, as I have indicated above, is clear enough.

GEORGE ROSEN
School of Public Health and Administrative Medicine, Columbia University, New York, New York

I did not miss Rosen's mention of diphtheria toxoid (page 337)—in fact I underlined it for review comment. I made an unfortunate choice of words in commenting, to which the author rightly objects. My apologies. Rosen did *mention* diphtheria toxoid as a late development in the fight against diphtheria described. This fight was, however, a campaign in which diphtheria toxin-antitoxin was utilized almost entirely. Toxoid did not replace toxin-antitoxin mixture until somewhat later.

I meant to indicate my regret that the author had not discussed toxoids and, in

particular, the use of tetanus toxoid in recent years. No tetanus toxin-antitoxin mixture has ever been used, and the use of toxoids in the immunization program represents a change of technique and an improvement in accomplishment worthy of record.

Universal immunization with tetanus toxoid would free us from that disease, as the Armed Forces experience has demonstrated. Each one of us is a potential, if not too likely, case of tetanus as a result of the accidents of home, field, shop, school, travel, combat, or recreation. All such injuries of any importance at all are usually treated with an injection of tetanus antitoxin—a serum which, if it protects, does so for one time only, and which may confer serum sensitivity on an individual or even induce an attack of serum sickness. Toxoid lacks these undesirable qualities, and in particular it confers an immunity of substantial duration. Properly given, it obviates the need for antitoxin. I feel that for adults tetanus toxoid is the most valuable vaccine now in use and that at the childhood level tetanus and diphtheria toxoids share honors in importance with the bacterial vaccine for whooping cough and the virus vaccines for smallpox and poliomyelitis.

Comment was made concerning Table III because I felt the title was not a happy one. The author does not bring that point into the discussion. If he wishes to present a table covering an era limited to the last two decades of the 19th century that is his privilege, and I should not propose admission to the group of the anthrax bacillus, which, no matter how many other virtues it may have as a scientific landmark, obviously does not belong. By the same token, of course, the leprosy bacillus should be removed from his table, since G. A. Hansen's paper appeared in 1874.

I agree wholeheartedly with the final paragraph of Rosen's letter.

LELAND W. PARR
George Washington University, Washington, D.C.

Names for Binary Numbers

In "A system of names for binary numbers," [*Science* **128**, 594 (1958)], Joshua Stern proposes a nomenclature to aid users of binary arithmetic to "think binary." Despite the utility of the system for small numbers, Stern concedes that long sequences of syllables become awkward at rather small numerical magnitudes and that recourse must be had to calling off the sequence of digits.

However, long binary sequences *can* be communicated (and remembered) economically by a better technique than calling off digits. This method, widely used by computer engineers, consists of dividing the number into groups of three digits, replacing each group by the corresponding digits from zero to seven, and using the resulting octal-based number. Groups of three, rather than four, digits must be used, for we do not have convenient single-element symbols for all quantities up to fifteen.

Thus, to use one of Stern's examples, the number 87_{10} or $101,0111_2$ (bruonedag bruapone) would be divided 1,010,-111_2 and read as 127_8—or one (octs^2), two (octs), seven—where (octs) represents 8_{10} units, (octs^2) represents 64_{10} units, and so on. I leave to Stern, with his "ap"titude for naming digits, the selection of names for these quantities. His term "cid" might be used for the first power of eight, of course.

A minor difficulty with the nomenclature proposed by Stern is the use of the nonphonetic English word "one" in the midst of sequences of unfamiliar phonetic terms. This leads to pronunciation difficulties for English speakers, and would not endear the system to non-English speakers. I suggest that the phonetic term "bit," with its useful connotations, might be employed instead of "one," without undesirable consequences.

LAWRENCE ROSLER
Bell Telephone Laboratories, Murray Hill, New Jersey

The 12 Sept. 1958 issue of *Science* [**128**, 594 (1958)] contains an article entitled "A system of names for binary numbers." In the article the author runs these named binary numbers into one another, stating, for two such names: "the larger value . . . being named first signifying *addition*" and "the smaller value being named first signifying *multiplication*." This is all very well as long as only two such quantities are involved. What is not stated is the law relative to a string of three or more such named quantities, which the author actually uses in the table of examples.

Consider, for instance, hiapdag. This is, according to the rule stated, hi + ap × dag. The question is, however, does the addition precede the multiplication, or vice versa? In other words, does hi + ap × dag mean (hi + ap)dag or hi + (ap × dag)? It will be noted that these are different. One might assume that the latter is correct, since that interpretation alone will cause the first example, hiapdagcidone, to equal 297, as we are told is the case. But not so, for in the very next example bruonedag must mean (bru + one)(dag) in order for it to equal 87. Likewise, in the third example aponedag must mean (ap + one)(dag).

One might hope to find the clue in the author's statement, "numbers not specifically named are expressed as sums and products of the named values analogous to conventions used with the decimal system." In the decimal system the named digits have values dependent upon their position, and thereafter ad-

(*Continued on page 279*)