How, then, should a title read so that a bibliographer may correctly classify its contents without having to look the paper up? First, the title should state definitely the subject under consideration—anatomy, embryology, habits, etc. Secondly, it should give both the scientific and the common names of the animal or plant (if it has a common name). The expert in that group of animals will, of course, recognize it by its scientific name, the worker on other animals will place it by its common name. And, thirdly, the group name should if possible be put in. For this the common names, fish, bird, insect, can generally be run in as a matter of course. I recall this title of a fine paper, "On the reactions of [the ghost crab] *Ocypoda arenaria.*" The words in brackets were not there and I was entirely at a loss to know what Ocypoda was. With the bracketed words inserted no one could possibly fail to locate at a glance the animal in its group.

Here follow some sample titles the like of which bring peace and not wrath to the troubled souls of bibliographers and librarians. "On the breeding habits and early development of the ganoid fish, *Lepidosteus osseus.*" "The structure of the skull in the gaff-topsail catfish, *Felichthys felis.*" "The development of the urinogenital system in the bonnet head shark, *Sphyrna tiburo.*" "The migrations of the common mackerel, *Scomber scombrus.*" "The method of locomotion in the climbing perch, *Anabas scandens.*" "The breeding habits of the fighting fish, *Betta pugnax.*"

It may not be as easy to make a good title as a bad one, but it can be done. Papers are written that they may be read; hence it will enhance the reputation of the writer if his titles are so clear that the bibliographer and the researcher must as a glance get the contents. And so, out of a hard and heart-breaking experience, as earnestly as I know how I wish to urge authors and editors to write such clear and definite titles as will make for the quick and accurate cataloguing and hence the ready accessibility of their papers. If so done, then by just so much will science be set forward.

E. W. GUDGER

THE AMERICAN MUSEUM OF NATURAL HISTORY

THE RELATION BETWEEN VOLATILITY AND TOXICITY OF NICOTINE

RECENT studies of nicotine as an insecticide have shown that the toxicity curve of nicotine in solutions is almost an exact parallel of its volatility curve. The efficiency of this widely used insecticide may be so lowered by improper methods of handling that the value of the treatment is greatly impaired, or the lowered rate of toxicity is overcome by increasing the dosage used until the expense is almost prohibitive.

Levorotatory nicotine (free nicotine) is volatile and more toxic than the non-volatile dextrorotatory form (nicotine salts). Reduced efficiency then may result from two reasons: (a) the use of non-volatile nicotine salts, such as nicotine sulfate with insufficient alkali to free the alkaloid from the combining acid; (b) the volatilization or oxidation of nicotine from ground tobacco which is being used as a vermifuge.

The loss of nicotine from concentrated solutions of varying alkalinities was determined by evaporation tests with measured amounts of air at a constant temperature and as a dried film on leaf surfaces. The results from these tests were so uniform that only one will be given, namely, the foliage test. The determination of nicotine was made by the silicotungstic acid method. The solutions were all made with distilled water except as noted. The loss of nicotine in three hours was 51.5 per cent. from nicotine sulfate; 85.9 per cent. from free nicotine, and 89.6 per cent. from nicotine sulfate with sufficient alkali to neutralize the combining acid. Comparing these results with solutions made from tap water as in spray practice, we find a loss of 52.5 per cent. and where soap is added, at the rate of four pounds per hundred gallons, the loss was 63.4 per cent. The maximum volatility of nicotine was attained only by the addition of alkali, while in spray practice it is usually assumed that most waters are sufficiently alkaline, especially if soap is used, to free the nicotine and give the maximum efficiency.

Bioassays of dilute nicotine solutions, but with the same alkalinity as above, were made both by spraying and fumigation. The toxicity to aphids (*Aphis hederae* Kalt and *Rhopalosiphum persicae* Sulzer) ranged from 53.6 per cent. for nicotine sulfate in distilled water (pH 6.5) to 76.5 per cent. for nicotine sulfate solution with alkali to neutralize the combining acid (pH 8.2). Nicotine sulfate in tap water plus soap as above (pH 7.6) had an efficiency of 65.3 per cent.

Fumigation tests with those same solutions on aphids showed a range of efficiency from 48.1 per cent. for nicotine sulfate in distilled water (pH 6.5) to 88.4 per cent. for nicotine freed from the combining acid (pH 7.9).

The same correlation between volatility and toxicity was noted in dust mixtures. Kaolin, powdered vegetable matter and sulfur alone gave a very slow release of nicotine. The addition of 10 per cent. of alkali, such as hydrated lime or sodium carbonate, increased the rate of volatility materially, and correspondingly so the degree of toxicity. Sulfur in large proportions aided materially in increasing the efficiency of the dust mixture. The most effective were those containing 80 per cent. or more of sulfur with about 10 per cent. of alkali. Reducing the amount of

sulfur to 40 or 50 per cent. gave a slower release of nicotine and decreased its efficiency.

E. R. DE ONG

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SCIENCE AND INDUSTRY

IN his speech at the annual dinner of the American Philosophical Society, Professor Lawrence J. Henderson congratulated the society upon the fact that it is not allied and almost in partnership with industry and business, but that it adheres to truth for its own sake and feels no need to advertise its wares and thereby cheapen them.

While no true scientists would ever have other than the *very highest respect* for those who pursue truth *simply* for the sake of truth, they will have *at least equal respect* for those who not only pursue truth for its own sake, but who are also keen to apply the results of their researches for the benefit of mankind, whether it be in the fields of medicine, chemistry, physics or other branches.

On the very page (477) whereon is printed Professor Henderson's address is the conclusion of a paper by Dr. A. S. Hitchcock, who states:

> Finally, I believe strongly that scientists as a class should carry their scientific attitude into the realm of affairs outside the world of science.

JEROME ALEXANDER

THE ARGENTINE WEATHER SERVICE

A FEELING of justice to others leads me to call attention to a mistake by Dr. Harvey W. Wiley in SCIENCE of May 9, 1924, p. 423, where he says of Professor Frank H. Bigelow, "He accepted a call from Argentina to organize the weather service of that country."

The weather service of Argentina was organized by Dr. Benjamin Gould in 1872. In 1876 Mr. Walter G. Davis became director and built the service up from small beginnings to one equaling if not excelling in most ways the meteorological organizations of Europe and North America. He retired in 1915 after 39 years of service and the directorship was assumed by George O. Wiggin.

Under Mr. Wiggin the Argentine Service began forecasting the weather from solar data, using more especially the solar heat measurements of the Smithsonian Institution, and now has a solar observatory of its own fully equipped and manned. It thus becomes one of the leaders of the world in this line.

Bigelow was invited to Argentina by Mr. Davis and his work was scientific research and the application of mathematics to meteorology and not administration.

H. H. CLAYTON

CANTON, MASS.

May 28, 1924.

SCIENTIFIC BOOKS

Chronologia Medica. A Handlist of Persons, Periods and Events in the History of Medicine. By SIR D'ARCY POWER and C. J. S. THOMPSON, New York, Paul B. Hoeber, IV, 278 pages, 84 portraits, $3.50.

THE name of Sir D'Arcy Power, one of the most estimable and worthy of living physicians, is a guarantee for the commendable intention of this book. If we venture to point out sundry slips and blunders in its execution, it is in the hope and belief that "corrective action," in the military sense, will make the second edition what it has every right to be, *viz.*, a reliable as well as useful manual for the student, practitioner and medical librarian. The idea of a chronologic panorama of the progress of medicine is not a new one; indeed, from the eighteenth century onward, medical chronologies of varying merit have been prepared and published at intervals by Sprengel, Choulant, Isensee, Pagel, Aschoff and others. In most of these, the contemporaneous happenings in secular and scientific history are printed, flush with each medical item, across two or more folded pages, necessitating a large format. The present arrangement is tandem, making a compact, handy *vade mecum,* confined to medical items alone. As the writers intimate, a medical chronology is but the skeleton or scaffolding of medical history, whence, in order to "clothe the skeleton" and give a "semblance of vitality" to dry lists of dates, many of the items have been set off by explanatory paragraphs. The authors are of opinion that dates help to fix the outstanding events and personalities of medical history in the mind of the student, at the same time reminding us that, in the earlier periods, such dates can be only approximations at best.

The chronology begins with the Assyro-Babylonian God Ea or Oannes (*circa* 5000 B. C.), who heads a list of medical divinities of Mesopotamia, Egypt, India, Persia, Greece and Rome. The chronology, as such, begins to assume practical shape with Greek medicine on page 13. The first thing noticeable in these earlier pages is that not all the gods and physicians listed are of essential importance, so that this part of the work is a bit cluttered up with those "unfamiliar names" which, in the dictum of Coleridge, "are non-conductors, stopping all interest." The unsophisticated student or the hard-worked doctor, looking for "values" in ancient medicine, will derive small consolation from such shadowy meaningless personalities as Esmun, "son of Synyk," Nenekhsekhmel, Wa T'o and Hua T'o, Syennis the Cypriote, Numenios of Herakleia, "who wrote a poem on fishing," or Uranius, "more famous for his conceit than his medical skill." Toward the later periods, the selection of significant names is almost beyond re-