DISCUSSION

NATURE'S MOVING PICTURE

IT is a fair question whether there is not something in our attitude toward photographic illustrations that makes us prone to let down exact standards. In scientific literature it is comparatively rare to find photographic reproductions of natural scenes accompanied by the full titles that they deserve. There is no system, and the standards of precision are lax. Even more is this true of general literature, but it is for science to set an example. An appeal is needed for more care and exactness in the titling of such photographs, and particularly for the definite assignment of each scene to its position in space and time.

One is apt to think of scenes as static and to lose sight of the fact that a photograph is a momentary and irreplaceable glimpse of nature's moving picture. If properly documented the photograph becomes a potentially important record of a stage in many dynamic processes. It depicts far more than the special point that the author desires illustrated, and the reader may be more interested in some other feature. To yield the full value with which every true scientist would wish to endow his illustration it must be titled with as great care as devoted to an important specimen. A first essential is that the reader be told where and when the scene transpired.

The publication of photographs in scientific papers is something of a luxury and only selected ones can be reproduced. Hence the more obligation to other sciences and to future generations to conserve all elements of value in the record. Authors and editors might well adopt as an axiom that a photograph is not worth publishing if it is not worth care in giving it a title of general and permanent utility. The statement of particulars as to the locality and time require no more space than the irrelevant or "show-window" verbiage in frequent use.

If one wished to indulge in muck-raking in scientific swamps, examples of offenses and offenders could be brought to light on every hand. The present writer might be the first conducted to the bar of justice. But to avoid personalities the following imaginary, though not exaggerated, example may be cited in illustration: "View looking along a street showing how the people live by making shoes." Here we have the useful information that it is a view and not a smell, that we are looking and not thinking, that it is a street and not a river, that the people are not dead yet, and that we are wrong if we think the industry depicted is merely a favorite national pastime. The reader must hunt through the text to find that the scene is probably somewhere in Tokyo—but possibly in Yokohama—and there is no indication as to whether it is before or after the time of any one of several earthquakes, or the time of a change in the building code, or the advent of a particular social influence. The same picture, now serving merely the passing thought of some geographer of Japanese industry, may contain useful information for present or future geologists, engineers, eugenicists and other scientists if given some such title as the following: *"Tokyo.* Shoemakers' quarter on Momachi Street; N.E. toward Matsu-bashi Bridge in distance. 10 A. M. April 18, 1922." A few months later, in the great earthquake, those people *are* dead, and that scene is gone forever. The event may be extreme, but it serves to emphasize the fact that changes are always in progress, and that unusually great ones may supervene at any moment.

The title above suggested is unnecessarily brief, and additional information could advantageously be given to add to the interest and value of the photograph. But it contains the main essentials, and shows that their presentation is not inconsistent with brevity. Given these particulars, many other relative facts could, if necessary, be reconstituted hundreds of years hence. But without these essentials the illustration may be more a burden to the literature than a boon.

Who can doubt that interest attaches to exactness in recording the time and place of photographs which may contribute to a graphic chronology of processes such as soil erosion, shore-line development, climatic change, or human history? The list of phenomena can be indefinitely extended to the point where practically all photographs would be included. It is to be hoped that a widening appreciation of this function of photography will bring a sense of purpose more broadly scientific than now prevails, not only in the choice and description of pictures for publication, but also in their preservation with full titles in collections and chronologic series.

ROBERT VAN V. ANDERSON

ALGIERS

THE CHEMICAL NATURE OF VITAMIN C

THE concentration of vitamin C from lemon juice has been continued in a manner similar to that recently described by Svirbely and King,[1] with the additional procedure of recrystallization from organic solvents (*e.g.,* ethyl acetate + petroleum ether). The recrystal-

[1] *Jour. Biol. Chem.,* 94: 483, 1931.

lized substance corresponds in chemical and physical properties to a hexuronic acid, and is apparently identical with the hexuronic acid described by Szent-Gyorgyi[2] and reported as a reducing factor in adrenal cortex, cabbage and other sources. Feeding approximately 0.5 mg daily protects growing guinea-pigs from scurvy and permits normal vitality in the animals when on a vitamin C-free diet. A detailed account of the experimental work will be published in the near future, but this involves only a few steps beyond the work previously published.

As in all such work, there is a possibility that contaminating active material has adhered to the crystals fed, but that seems unlikely, since the maximum activity has reached an approximate constant with recrystallization, and much of our previous work has indicated such a chemical nature for the active factor.

The recent report of isolation and synthesis of vitamin C by Dr. Ottar Rygh[3] is not in accord with many of our findings, and we believe his experimental results were misinterpreted. It is perhaps sufficient to point out from his paper: (a) That experimental animals receiving his synthetic o-diphenol derivative of narcotine in addition to their basal vitamin C-free diet survived no longer than those receiving the basal diet only; and: (b) That the animals receiving a partial supply of vitamin C in addition to the synthetic compound showed a physiological response not greatly different from that of the group which received only the partial supply of natural vitamin.

C. G. KING
W. A. WAUGH

DEPARTMENT OF CHEMISTRY,
UNIVERSITY OF PITTSBURGH

STUDIES IN MOTOR AND MECHANICAL SKILLS

RECENT experimental articles and reviews on the field of "mechanical ability" have advanced important experimental data and widely varying interpretations. The latest review by O. L. Harvey[1] suggests possible reconciliations of the divergent views so far published and in closing suggests that "It might be an interesting piece of research to analyze in terms of the tetrad difference technique the data obtainable from a homogeneous group in response to (a) a test of verbal intelligence, and (b) a combined battery including tests such as (1) the Minnesota assembly and spatial relations tests (for mechanical ability); (2) a selected group of Cox's models, explanations, etc. (for mechanical aptitude); and (3) either the Minnesota tests for steadiness, card sorting, packing blocks and tapping, and Link's machine operators' test or some form of motor skills battery, similar to that developed by Seashore (for motility)."

In view of the numerous discussions aroused in these fields of motor and mechanical performances it may be of interest to note that a study which brings together most of these as well as numerous other measures is now in its second year of progress at the University of Oregon with the assistance of grants-in-aid from the National Research Council and the University of Oregon.

The two main objectives of this research are (1) to determine the interrelations of individual differences in fine and gross motor skills with mechanical skills, and (2) to trace the differentiation of fine motor skills in the early years of life. Tests included in this study are the six motor tests comprising the Stanford Motor Skills Unit[2]; the spatial relations tests, assembly tests and paper form boards from the Minnesota Mechanical Ability Tests; measures of postural steadiness, using the Miles Ataxiameter; measures of arm tremor in two dimensions, using the Beall and Hill Ataxiagraph, a graded series of measures of tapping and other hand and arm motions; simple reaction times to light and sound stimuli; the Cozens tests for measurement of general athletic ability; as well as measures of height and weight. Scores on the A. C. E. College Entrance Test are also available for all observers.

By the end of the present academic year the data on these tests should be complete on fifty male university students and it is hoped to continue the study for a third year in order to have one hundred observers. The desirability of using the tetrad difference technique rests largely upon other findings, which will be discussed in a future article.

In previous studies at Oregon boys of age 6, 10, and 15 years were given shorter lists of the same tests, and data on three motor tests given to preschool children at the University of Iowa are also available. Several studies under way are investigating the stability of the individual differences over long periods of time. Two other studies on the prediction of practical skills in typing and handling of knitting machines indicate that the whole field of aptitude hypotheses must be reformulated to determine the relative importance of selecting personnel,

[2] *Biochem. Jour.*, 22: 1387, 1928.
[3] *Zeit. f. Physiol. Chem.*, 204: 105, 1932.
[1] O. L. Harvey, "Mechanical 'Aptitude' or Mechanical 'Ability'?—A Study in Method," *Jour. of Educ. Psychol.*, 22, 517–22, 1931.

[2] Several studies using this battery have demonstrated the high degree of specificity of its component tests. For this reason it should not be considered a test of "motility" as suggested by Harvey. *Cf.* R. H. Seashore, Stanford Motor Skills Unit., *Psychol. Monographs*, 1928, 39, 51–66; and *ibid.*, "Individual Differences in Motor Skills," *J. General Psychol.*, 3, 38–66, 1930.