Preface to a Prolegomenon

When the Geneva talks on suspending nuclear tests resume on 8 June, there is a possibility that the impasse of on-site inspection may be avoided. The Western powers have argued for such inspection because an earthquake that instruments are unable to identify as of natural origin might be the result of an underground nuclear explosion. The Soviet Union has argued that inspection should be subject to veto by the participants because it presents opportunities for espionage. Prime Minister Macmillan proposed a way out of the impasse which was seconded by Premier Khrushchev and which was introduced officially into the Geneva test talks by the Soviet delegation before the current recess. The proposal was to limit the number of veto-free inspections permitted each year.

The American delegation has been sufficiently interested in the proposal to join the British delegation in asking the Soviet delegation to elaborate on a number of points, among which are: how many inspections should be permitted each year? and what should be the scientific criteria for determining when an earthquake is a candidate for inspection? Although these questions concern provisions to be written into a test treaty, the answers would seem to require a scientific opinion on the technical implications of such matters as the number of natural earthquakes occurring annually in various parts of the world. But before such an opinion can be rendered, the Western powers and the Soviet Union must agree to assemble the necessary experts.

Moscow has at times been willing and at times unwilling to allow Soviet scientists to meet with Western scientists. Soviet scientists participated in technical talks last summer, and these talks led to the political talks now in recess. Early this year, however, Moscow was not willing to call in Soviet scientists to examine the new data concerning the differentiation between natural and artificial earthquakes that the United States developed in the course of its project Hardtack. The reason for the refusal probably was that such a study would have indicated the need for a more extensive inspection system than the one based on information developed at the summer talks. Moscow recently expressed interest in exploring further the means for detecting high-altitude explosions, but this gain does not apply to the present problem since such explosions offer no site to inspect.

Scientific talks may be a necessary prolegomenon to political talks, but the agreement to conduct scientific talks requires an initial political accord. The problem of determining a suitable limit to the number of on-site inspections is important not only in its own right but as an illustration of the need to include in the test treaty a mechanism for convening future scientific talks. Since it is likely that advances in science requiring modification in the system will occur, East and West must agree to recognize such advances, evaluate them, and revise the system accordingly. The inclusion in the treaty of a clause allowing for the revision of other clauses is a condition that we trust the Western powers will insist on and one we hope the Soviet Union will accept.—J.T.
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SCIENCE ON MICROCARDS
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Meetings

Science and Mathematics Teachers

The Central Association of Science and Mathematics Teachers (CASMT), a recent affiliate of the AAAS, was organized on 7 June 1902 as the Central Association of Physics Teachers. A committee from 25 schools met in Chicago on that date to consider organizing an association of physics teachers. At the meeting a constitution was adopted, and plans for a later meeting were developed. At the second meeting, held at the Armour Institute of Technology in Chicago, 9–11 Apr. 1903, the membership of the association was broadened to include teachers from all fields of science and mathematics. The larger organization was renamed the Central Association of Science and Mathematics Teachers. The aim of the association, ever since this meeting in 1903, has been to improve instruction in mathematics by introducing the laboratory method, and to bring about a closer correlation of mathematics with the various areas of the science curriculum, especially physics.

Beginning with the third meeting, conventions have been held annually during the Thanksgiving vacation period; meetings were held even during the war years. Ordinarily, meetings are held in Chicago for two consecutive years, then in one of the larger cities in the Great Lakes area. The attendance at such meetings varies from 500 to 1200. The membership, which now exceeds 1400, is not restricted to the Central States. Members come from all 49 states and from Canada, Europe, Asia, Africa, and Australia.

Communication among the members of the CASMT is maintained through the association journal, School Science and Mathematics. The journal features articles on research as well as the more scholarly variety of expository articles on course material and teaching in science and mathematics. The journal is now in its 57th year, and circulation exceeds 5000. Nine issues of the journal appear annually, from October through June. The present editor is George G. Mallinson.

The association, at recent meetings, has been emphasizing the relationships between science and mathematics and industrial processes and applications. Field trips through major industrial installations have been a special feature of the conventions and have been well attended. The CASMT, the only association that specifically emphasizes the relationships between science and mathematics, is undertaking a major examination of these relationships. Such activities are eminently important in view of the extensive reevaluation of both science and mathematics teaching at the present time.

The officers for 1958–59 are as follows: president, Clyde T. McCormick (Illinois State Normal University); vice president, F. Lynwood Wren (George Peabody College, Nashville, Tenn.); secretary, Joseph Kennedy (Indiana University); treasurer, Ray Soliday (Oak Park High School, Oak Park, Ill.).

George G. Mallinson
Western Michigan University,
Kalamazoo

Film Congress in Britain

Representatives of documentary and scientific film organizations from many countries will meet at the 13th congress of the International Scientific Film Association, to be held in London and Oxford from 23 September to 2 October. This year it is expected that more than 200 films covering research, medicine, education, and popular science will be screened during the congress and its accompanying festival. The award-winning films will be shown at the National Film Theatre on 2 October. The British Scientific Film Association is organizing the conference. Further information may be obtained from the association's office at 3, Belgrave Sq., London S.W.1, England.

IAEA Nuclear Conferences

A symposium on radioactivation analysis will be held in Vienna, 1 to 3 June under the joint sponsorship of the International Atomic Energy Agency and the Joint Commission on Applied Radioactivity of the International Council of Scientific Unions. Other meetings on some practical aspects of the peaceful uses of nuclear energy have also been organized by the International Atomic Energy Agency.

In July, nearly 80 experts are expected to attend a seminar at Saclay, France, on the training of specialists in the peaceful uses of atomic energy.

A 6-day conference in Warsaw, Poland, on the application of large radiation sources in industry, especially to chemical processes, is scheduled for 5–11 September. Some 300 delegates are expected to participate.

Standardization of radioisotopes will be discussed at a symposium on radioactive metrology that is to be held in Vienna in October. About 100 participants, chiefly from national laboratories, will exchange views aimed at establishing internationally accepted methods of standardization.

The last in the series of meetings will be a conference on the disposal of radioactive waste, to be held in Monaco in
Forthcoming Events

June
29-3. Superconductivity, IUPAP colloquium, Cambridge, England. (D. Schonberg, Dept. of Physics, Univ. of Cambridge, Mond Laboratory, Cambridge.)
29-4. Glass, 5th intern. cong., Munich, Germany. (P. Gilard, International Commission on Glass, 24, rue Doureut, Charleroi, Belgium.)

July
1-3. Hydraulics, annual conf., Fort Collins, Colo. (W. H. Wisely, American Soc. of Civil Engineers, 33 W. 39 St., New York 18.)
3-5. International Union of the Medical Press, 4th cong., Cologne, Germany. (Dr. Stockhausen, Secretary of Bundesarchivkammer, Cologne.)
4-9. American Soc. of X-ray Technicians, Denver, Colo. (Miss G. J. Eilert, 1614 St., Fond du Lac, Wis.)
6-12. Chagas’ Disease, intern. cong., Rio de Janeiro, Brazil. (C. Chagas, Instituto de Biica, avenida Pasteur 458, Rio de Janeiro.)
7-10. Royal Medico-Psychological Assoc., annual meeting, Glasgow, Scotland. (RM-PA, 11, Chandos Street, London, W.1, England.)
13-17. National Assoc. of Power Engineers, natl. conv., Boston, Mass. (A. F. Thompson, Secretary, NAPE, 176 W. Adams St., Chicago, Ill.)
13-17. Standardization, intern. (council meeting), Geneva, Switzerland. (ISO, 1-3, rue de Varembe, Geneva.)

(See issue of 15 May for comprehensive list)
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Letters

Francisco Duran-Reynals

The genuinely admirable qualities that characterized the career and personality of the late Francisco Duran-Reynals have been captured adroitly in the beautifully drawn portrait by C. C. Little [Science 129, 881 (1959)]. I should like to add still another word in appreciation of Francisco Duran-Reynals, focusing upon a particular aspect of his life.

Francisco loved young people. Many of us came to know this as Jackson Laboratory summer students—even in fields far removed from microbiology. It was a common practice for scientists associated with the laboratory to give talks to the students, and Francisco’s lectures were of particularly high quality. Informative and wonderfully lucid, they had an incisive logic and stylistic beauty that made us strain to hear every word.

It seems that he gave to these talks the same type of weighty consideration that would mark preparation of an address to a body of distinguished scholars. One could infer this, of course, from listening to him, but we acquired other evidence. For example, he and his lovely wife frequently invited us to “painting parties” at their house overlooking Bar Harbor. One Sunday afternoon when we came to fetch him, he was in his study and did not want to be disturbed. He was to talk to us the next morning, and we learned that he was terribly worried, lest it not be a success. He had been brooding over the lecture material all day.

When he emerged much later in the afternoon, I remember him taking me aside and commenting with warmth about the beauty of *Leuven exquisite*—the hour before sundown which he loved so well. And, knowing of my own love for sunsets, he suggested I not despair at my impending return to New York City: Manhattan had sunsets, too; it was just that sometimes the tall buildings get in the way.

This consideration for us and our feelings became apparent in other ways, too. On the occasion of an important meeting in New York, some of us came to hear him, and lingering on somewhat gingerly at the end of the session, we wondered whether he would remember us and debated whether or not to greet him. But he spied us. Hurriedly excusing himself from eminent colleagues who had surrounded him, he rushed up the aisle, threw his arms around us, and, launching into exuberant conversation, shepherded us out of the hall. (How many of us today give so much disinterested attention?)

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Russell W. Bunting, School of Dentistry, University of Michigan.

AAAS, 1515 Mass. Ave., NW,
Washington 5, D.C.
I do not know the extent of his lecturing at Yale. I do know that Francisco Duran-Reynals was a great teacher and a wonderful human being.

Michael Kaplan
Experimental Psychology Laboratory,
Creedmoor Institute for Psychobiologic Studies, Queens Village, New York

Balance in Cultivated Ecosystems

In their very interesting article on "Acrolein for the control of water weeds and disease-carrying water snails" [Science 129, 335 (1959)], Overbeek et al. describe their experiments in ridding irrigation ditches of water weeds and fresh-water snails by the addition of small amounts of acrolein to the irrigation water. They state, "Treated water, when used for irrigation, did not harm crops. Further studies, on possible acrolein residues in crops and on the toxicity of treated water with respect to farm animals, are being made."

It is reassuring to know that attention is being given to possible toxicity to human beings and farm animals. It would be interesting to know, further, if any studies are contemplated on the effect of this treated water on the soil microbiota in the land that is being irrigated.

Soil scientists reiterate constantly the importance of the soil fauna and flora in the development and maintenance in good condition of soils. It would be disastrous indeed to discover, after a few years of ditch-cleaning with this highly toxic substance, that the essential soil biota had been destroyed and that permanent or long-term impairment of large areas of irrigated soils had taken place.

Ecologists interested in the maintenance of a healthy balance in cultivated ecosystems should be much concerned about matters of this sort.

F. R. Fosberg
Falls Church, Virginia

Fosberg will be glad to learn that in addition to tests of the effect of treated irrigation water on crops, soil microbiological tests have been made and are continuing.

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*CES 59*
Letters

Education of Science Teachers

The recent exchange of letters on the education of science teachers [Science 129, 744 (1959)] has shown clearly that a major point of disagreement between educationists and their opponents concerns the utility of education courses. On the one hand, the educationists assert that teaching is a profession which requires special, professional training; on the other hand, many people feel that anyone who knows his subject well can teach it satisfactorily. In practical terms, the question is: Can a college graduate teach as well, in his major subject, as a graduate with the corresponding degree in education? And, more generally, what mixture of education courses and "content" courses will produce the best teacher?

Both sides have produced arguments to support their views, but there has been very little objective evidence to support either view. What evidence there has been is one-sided, rather than comparative. Thus, the educationists ask, "Can 50 years of research in education be ignored?" while their opponents point out that education courses are widely regarded by undergraduates as easy to pass and negligible in content. What is needed in order to remove the controversy from the realm of mere verbal sniping to that of informed and intelligent debate is a body of facts on the effectiveness of teachers who have been trained in different ways.

A direct way of obtaining this information would be to compare the scores, on a nationally administered series of tests, of two groups of students: those whose teachers majored in education and those whose teachers majored in the subject concerned, without taking any education courses. Such tests already exist, and teachers of the second type are already at work with temporary accreditation in many places. Thus it might be possible to obtain the desired information from statistics or other information which already exists; on the other hand, it might be necessary to set up an extensive experiment, selecting teachers and students with appropriate backgrounds in order to free the comparison from systematic effects which might distort results obtained from the existing data. (For example, if poor students tend to take education courses because they are "easy to pass," this must be allowed for in comparing the intrinsic utility of education courses with that of "content" courses for training of teachers; but if we are interested in the relative effectiveness of education and "subject-matter" graduates as teachers, then such effects should be ignored.)

Until some such study is made, I do not see how the present controversy can be anything more than a difference of opinion which, for lack of evidence, cannot be resolved.

Andrew T. Young
11 Buena Vista Park,
Cambridge, Massachusetts

Luminous Wrist Watches

Joyet [Bull. acad. suisse sci. méd. 14, 367 (1958)] reports that the average man's luminous wrist watch contains 0.36 μ of radium and the average woman's watch, 0.13 μ, both being of the type in which the entire dial is painted. A man wearing such a watch 24 hours a day receives a gonadal dose of about 21.8 mrem yr, and a woman receives about 12.7 mrem yr, as measured by Joyet.

A sample of 224 persons (a group of Government employees in New York City in all of the occupation categories and levels represented) was investigated. Questions were asked and observations were made as to type of watch and wearing habits, with the results given in Table 1.

When Joyet's results were combined with the results for this sample of New Yorkers, it was found that the average gonadal exposure of the 224 persons is calculated to be 3.83 mrem per year per person. The fact that very few, if any, persons in the age group up to age 30 or 35 wear watches for the first 10 or so years of life should not be ignored. This would tend to reduce the figure 3.83 to about 2.5 mrem yr. This reduction might be offset slightly by the fact that, of the luminous watches worn, a larger fraction is worn by younger than by older adults. This was a general observation, and findings were not tabulated.

If we assume, then, that the average annual dose is about 3 mrem from birth to age 35, the 35-year dose will be about 0.1 r, as compared with the estimate by Laughlin and Pullman of 0.03 r (range 0 to 0.3 r) given in the National Acad-

Table 1. Data on the wearing of luminous watches from a survey of 224 Government employees in New York City.

<table>
<thead>
<tr>
<th>Item</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number questioned</td>
<td>148</td>
<td>76</td>
</tr>
<tr>
<td>Number wearing watches of all types</td>
<td>114</td>
<td>57</td>
</tr>
<tr>
<td>Number wearing luminous dial watches:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 10 hr/day</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>10–19 hr/day</td>
<td>34</td>
<td>2</td>
</tr>
<tr>
<td>19–24 hr/day</td>
<td>16*</td>
<td>0</td>
</tr>
</tbody>
</table>

* Only one watch found with luminous points (Joyet's category P).
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emy of Sciences report of 1956. This amounts to about 3 percent of natural background radiation and only about 1.5 percent of the total radiation dose derived from background plus medical and dental exposure to the gonads, as currently estimated.

HANSON BLATZ
City of New York Department of Health, New York

Ruth Benedict

Julian Steward, in his long and prevailingly generous review [Science 129, 322 (1959)] of An Anthropologist at Work, Writings of Ruth Benedict, raises three issues which seem to call for clarification. He interprets my discussion of Ruth Benedict as a "figure of transition" as referring to her role in linking together the Boas period of anthropology and one small segment of contemporary culture and personality research known as "national character." I did not use the term in any such parochial sense, but rather in reference to the whole intellectual climate of opinion of the second quarter of the twentieth century.

Steward asks why I did not mention the Kardiner-Linton seminar held at Columbia University in the late 1930's. At the time that Abram Kardiner independently began to apply psychoanalytic theory to the study of culture, the major theoretical lines for the study of personality and culture (as in John Dollard's Criteria for the Life History) had already been worked out by Roheim, Sachs, Fromm, Erikson, Frank, Dollard, Sapir, Gorer, and myself, and Ruth Benedict was already familiar with them. Kardiner's one new contribution—his theory of primary and secondary institutions—neither she nor I found useful. Although it is uncertain to what extent Ralph Linton mediated the existing literature to Kardiner, I have always regarded Kardiner's work as an example of historical parallelism.

On the third point, the extent to which Steward feels that the Columbia University department of anthropology was, during his membership in the department, a continuation of the Boas tradition, Steward himself is surely the best authority.

MARGARET MEAD
American Museum of Natural History, New York

Winchester's Genetics

In a review of A. M. Winchester's book, Genetics [Science 129, 91 (1959)], the reviewer dismissed the book as one that he could not recommend for use by students of the subject. He commented that the book was apparently written for college students with little formal education, and he seemed to imply that there was something wrong with such a text being anthropocentrically oriented. Since the book was published by a distinguished publishing house, and the series in which it appears is edited by a geneticist who was also a member of the Editorial Board of Science, it seemed to me that something must be awry somewhere. I therefore sent for a copy of Winchester's book, and having read it I have now satisfied myself where things went awry. They went awry with the reviewer. He committed the cardinal sin of reviewing, namely, reviewing a book at a level for which it was not written and at which it was never intended to be read. The author quite clearly sets out the classes of readers for whom the book is intended: the nonspecialist student in genetics, the student of psychology, sociology, or medical science, and those wishing to take the course as an elective or as a part of a general education program.

As one who has had to learn his genetics from books, and who has read a representative number of them over the course of the years, I should like to protest the reviewer's unfair dismissal of this book, and to go on record as saying that Winchester's book is, in my opinion, a book eminently well suited to meet the requirements of a first and perhaps only course in genetics for the student who is not specializing in the subject. The text is clearly and soundly written, the illustrations, tables, and figures are clear and quite generally most interesting in themselves, and the problems are most helpfully constructed. The orientation toward man makes the book unusually interesting.

ASHLEY MONTAGU
321 Cherry Hill Road, Princeton, New Jersey

While it is true that Winchester's book is meant to appeal to students of varied backgrounds, it is apparently meant for biology students as well. This point, however, is really quite unimportant, for the real issue is whether any textbook that treats its subject in a trivial and superficial manner should be used in any course in our universities.

Montagu is entitled to his opinion of the book, but his obvious appeal to the authority of a member of the Editorial Board of Science is unworthy of serious comment. I am sorry, however, that I have piqued the sensibilities of an anthropologist by complaining about the excessive anthropocentric orientation of a textbook of genetics.

S. R. GROSS
Rockefeller Institute, New York