Comments and Communications

International Organization of Scientific Documentation Based on Legislation

HAVING worked for some years on geological and especially paleontological subjects, I have, like many other researchers, come up against the ever-growing difficulties of documentation and have been forced to the conclusion that really serious paleontological work is almost impossible because workers are not able to get all the necessary documentation on the subjects that interest them. A serious consequence is that the best of them too often desert, or at least their research flags; and the *arrivistes* or the *mediocres* acquire the habit of publishing on subjects for which they are aware that they have not consulted the necessary references. Attempts to correct this situation have nearly all failed owing to the individualism or the *chauvinisme,* mostly unconscious, of the organizers, or to insufficient financial resources.

In France, however, one must not neglect the work undertaken by the CNRS in its *Bulletin analytique* and by Dr. Roger in the Geology Branch of the Paris Muséum National d'Histoire Naturelle, in his Centre d'Etudes et de Documentation Paléontologique (CEDP), where nearly all the articles reaching Paris on the earth sciences are recorded on cards and analyzed.

The basis of modern documentation is the annotated, analytical card file, and from what we know of the present status of documentation we may conclude that (1) dozens, possibly hundreds, of people are preparing cards of the same works and are thus engaged in useless duplication of labor; (2) useful scientific documentation, in every field, is growing in volume and is acquiring more and more an international character; (3) the present system of analysis implies that every worker or research organization must pay the cost, not only of documenting the references that are of interest but also of many others; (4) no national or private enterprise for documentation has as yet been able to remedy this waste of time and money, and it is doubtful whether any general agreement to correct the situation will succeed; (5) the time now consumed in duplicate documentation could be much more usefully devoted to the systematic classification of documentative cards by subjects of interest; (6) in general authors of articles are the ones best equipped to prepare summaries of them.

The present situation, which is steadily becoming worse, is so critical that the following remedial measures may profitably be considered:

1) Steps would be taken by Unesco to secure the adoption of a law in all the countries of the world (a law alone being susceptible of being followed in spite of neglects or nonenforcement) prescribing:

a) That all articles printed in a country be allowed to circulate only if they are accompanied by cards of standard size giving all the pertinent references, and cards giving an analytical abstract—one in the author's mother tongue, the other in the language most in use or allowing the most rational and precise expression of facts and ideas (tongue to be chosen by an international congress);

b) That separate reprints of these cards be issued in sufficient quantity and sent to a national or international agency for exchange in a prescribed manner, so that in every country a state organization may provide all the main research centers with all the cards of interest to them for a cross-indexed card file. This organization should also provide, at cost, every individual researcher with the cards he may want. The staff previously employed to prepare cards or abstracts might then be set to work on a systematic classification of material so as to provide every worker with all the documentation concerning research on a given subject.

2) An international scheme for the documentation of material published prior to the application of the law should be established. It is suggested that each nation prepare an inventory of its own publications and assign the task systematically to existing organizations (libraries, laboratories, etc.) for as rapid completion as facilities may permit.

3) To finance the national and international agencies created in consequence of the application of the proposed laws and agreements, the transfer and consolidation of many existing agencies should suffice for the most part.

4) For control an advisory commission should be established, comprising delegates of scientific organizations from the various countries and specialists in documentation. This commission would form a sort of international scientific council on documentation.

Assuming the question of the card file and abstracts to have been resolved in the manner outlined, a second difficulty, as yet practically and statistically unsolved, is the question of the languages into which the cards will be translated for international distribution. Even if a researcher has been able to provide himself with all the cards concerning the subject he is working on, he must still understand the references. The adoption of a universal language for abstracts is one possibility. In any event, the cost of translation, even by a specialized agency, will be prohibitive. It seems that only one possible practical solution may be considered: training of specialized translators (for instance "French, Spanish, Italian" or "Slav languages," etc.) with a sufficient scientific specialty education, and an opportunity for the specialized researchers to confer directly with the translators.

In many countries the efficient pursuit of research will soon become impossible under present conditions owing to the ever-growing difficulty of documentation and in spite of increasing specialization of the sciences. The remedies proposed here are the training of translators with specialized scientific information who

would be available for oral consultation; the systematic and periodic publication of up-to-date compilations dealing with each branch of research; and the creation through Unesco of an international organization for the preparation of card files based on the application in every country of laws prescribing the printing of abstract cards at the same time the work is published. It will require some legal compulsion to overcome inertia, nationalism, individualism, and competition, and thus promote the most rapid advance of research on an international scale.

JACQUES AVIAS

Université de Nancy et *Ecole Nationale Supérieure de Géologie Appliquée et de Prospection Minière*
Nancy, France

Vitality of the Aged

THE writer presented statistical evidence in 1929 (SCIENCE, 70, 85) of a persistent retrogression in vitality among the aged of both males and females of this country—in marked contrast with the distinct improvement at all earlier ages. Similar results were obtained by others, and this retrogression was reported to be generally accepted by the representatives at the recent International Gerontological Congress at St. Louis.

The writer now wishes to present evidence based upon succeeding years of a surprising improvement at these advanced ages. This report is brief and preliminary because we still await an analysis of the data from the 1950 U. S. census for further assurance that improvement has come to stay.

Table 1 gives the death rates (per 10,000) at ages 70 and 80 for both males and females for the earlier decennial years, as well as for the later years 1930 and 1940.

TABLE 1
DEATH RATES (PER 10,000)

Year	Males (age)		Females (age)	
	70	80	70	80
1890*	556	1227	502	1127
1900	606	1323	549	1206
1910	630	1387	569	1259
1920	605	1319	568	1225
1930	600	1309	517	1188
1940	599	1290	469	1138

* Seven states.

It should be noted that the maximum rates seem to have been reached sometime between 1910 and 1920 for both males and females, and that the rates have now fallen to about what they were at the beginning of the century, when official records of deaths began. The females enjoy lower rates throughout.

The rates tabulated in Table 1 apply only to the ten original registration states (the six New England states, and Indiana, Michigan, New Jersey, and New York), which were the only states to supply official mortality data from the beginning of the century, and were computed by a technique used in constructing abridged mortality tables.

C. H. FORSYTH

Department of Mathematics
Dartmouth College

Applications of Ecology and Economics to Fisheries

NEWCOMBE (SCIENCE, 114, 27 [1951]) holds up halibut management as a model to the California pilchard industry and says that pilchard investigators "were quite well aware that a major catastrophe was imminent because the *catch per unit of effort* was on the decline, even though total catches continued to increase. . . . Numerous warnings were issued by the Division of Fish and Game as early as 1930, but, seemingly, research evidence was in itself insufficient proof."

This is naïve, to say the least. Sette (in a profound and authoritative paper included in Newcombe's list of references) was of the opinion in 1943 that "at the present stage of research on the pilchard population, we do not have any notion" what fishing intensity would be desirable, and this evidently is still true. The same may be said of halibut (Burkenroad. *Bull. Bingham Oceanog. Coll.*, 9, [4], 81 [1948]; *Texas J. Sci.*, 2, 438 [1950]; *Bull. Inst. Marine Sci., Univ. Texas*, 2, 1 [1951], which extends the discussion to general principles).

The disaster that overtook the pilchard fishery in the late 1940s was evidently connected with unfavorable natural changes. Newcombe's view that the occurrence could have been "averted" by fishery restrictions thus implies belief that, if the catch had been smaller, the recruitment, growth, natural survival, and/or availability would have been greater. Otherwise he must mean merely that, if the marketable catch had been sacrificed to permit more of the fish that came into range of the fishery to remain in the water, some of these might for a time have been included in subsequent catches to cushion the effects of shrinking renewals on raw-material costs.

However, Newcombe cites no evidence that the pilchard stock has been driven below its level for maximum equilibrium yield. It has to be borne in mind that events accompanying and following the temporary obliteration of a number of great fisheries for clupeids (e.g., for Gulf of Maine menhaden in the nineteenth century, and for herring in one or another Swedish area during the thousand years of record) do not suggest that these local changes in abundance could have been significantly affected by any human act.

It remains to be seen whether even the present immense expansion of the pilchard research program can furnish proof that restrictions would have procured (or are now procuring) a net gain to society through effort saved without countervailing sacrifice of catch. The summary by McHugh and Ahlstrom (*Sci. Monthly*, 72, 377 [1951]) is hardly encouraging.