poses and not designed for indexing in depth. One of the almost classic arguments in the documentation literature starts by pointing out that the Dewey Decimal System may be all right for small public libraries but breaks down completely when it is applied to indexing scientific literature in depth, and that we must therefore go to . . . (whatever it is that is being proposed). Now, nobody who has the least familiarity with bibliographical method has proposed that we use Dewey for this purpose, and other tools have commonly been used. For example, the Index to the Literature of American Economic Entomology, prepared by the Department of Agriculture Library in cooperation with the American Association of Economic Entomologists, has for more than a generation provided "concept bibliography," in which each insect, insecticide, parasite and host, and so on, in the entomological literature is indexed, consistently and usably and inexpensively. Far wider general dissemination has been achieved with this index than with any of the so-called newer devices. This example is but one of many systems which have resulted from the cooperation of subject specialists and bibliographers (or subject specialists acting as bibliographers and *working* at it).

Furthermore, no system is any better than it proves to be in operation. By way of example, let us consider a study I made of a very large information center, which shall be nameless. It had a sophisticated code book and trained subject specialists to apply it. It had trained librarians on the output side and a very complete and well-managed punched-card shop, with much interesting associated hardware. To test the system, we submitted clean copies of a large number of documents to the analysts who had coded them several months earlier, and in no case did we get the same coding for the document as that given earlier. We then resubmitted inquiries to the reference librarians who had handled these same inquiries several months earlier and asked them to supply the codes for machine search. In no case did we get the same coding for machine search for a given subject as had been given earlier. And then, as a final test in this series, we sent a sizable sample of inquiries to the punched-card shop for searching. We selected searches that had been made in the punched-card files 3 to 6 months before, and we sent the tab shop the codes for these subjects that had been submitted for the previous search. In no case did we get identical literature citations. It did not take much investigating to determine the causes of these wide discrepancies, and corrective measures were applied. But this experience, which is not uncommon, indicates reasonably clearly that not all of our problems are problems of lack of adequate theory or tools.

In concluding this brief appeal for sanity and hard work, may I submit that we need to learn more about the parameters that apply to each species of tools and to each tool under varying conditions, and that we need to consider applications of these tools as integral parts of systems for providing information services to scientists rather than as ends in themselves. This means that we need to work on basic theory in our field, and it also means that someone has to tend the store while we are doing this, unless we expect science to do without information services while we are designing theoretically optimum systems. This means that, important as the improvement of techniques is, we ought to take the plumbing out of the front office and put it back into the workrooms and the associated documentation research laboratories.

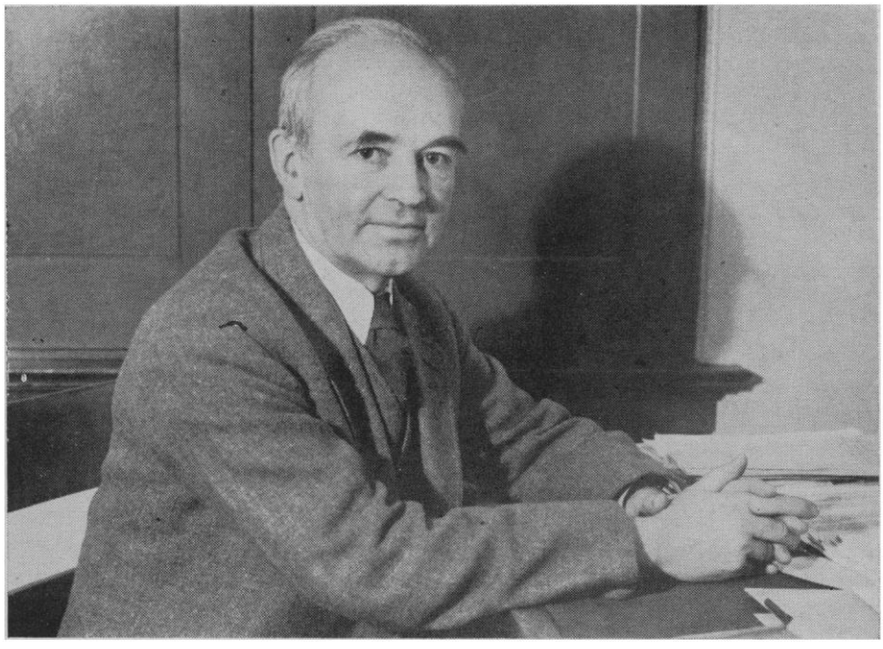
The front office should be designed to get each research worker what he needs when he needs it, and in the form in which it is most useful to him, regardless of what we have to do behind the scenes to achieve this, and regardless of how we do it. Only insofar as we achieve this objective currently and continuously can scientific information services contribute to the advancement of science.

Arthur Russell Moore, General Physiologist

The science of physiology has had its historical focal point in medicine, but it has had, as well, a broader tradition in the more general aspects of the subject. This tradition has developed in part through the missionary efforts of a few conspicuous figures, but it owes much to the balance contributed by devoted, if less famous, scholars whose interests centered in the most fundamental aspects of vital phenomena. Arthur Russell Moore was one of these scholars, and one of a dwindling group inducted into physiology by Jacques Loeb.

Moore was born in Beaver, Furnas County, Nebraska, on 10 November 1882 and received the B.A. degree from the University of Nebraska in 1904. After 3 years as a school teacher, he went as a graduate student to the Spreckels laboratory of physiology at the University of California, Berkeley, where he received a Ph.D. in 1911.

Those were great days in Berkeley, Jacques Loeb had been brought out from Chicago to establish a physiology department, and his mission was to clear the last lingering mists of *Naturphilosophie* from biology. Fresh from his triumphant demonstration of artificial parthenogenesis, Loeb was going to solve the problems of cellular biology by studying the properties of proteins, and the problems of behavior by studying reflexes and tropisms. Moore's colleagues and teachers included S. S. Maxwell, J. B. MacCallum, T. Brailsford Robertson, and C. L. A. Schmidt, and his own first scientific paper was a treatise on the biochemical concept of dominance, an early essay in biochemical genetics. Throughout his long and productive career, represented in more than 100 scholarly publications, Moore retained a primary interest in



Arthur Russell Moore [University of Oregon]

the two fields which were dominant at Berkeley in those days—mechanisms of fertilization and animal behavior—but he was a broader thinker and a better biologist than his teacher, and he never succumbed to the extreme and, as it turned out, superficial mechanistic doctrines which Loeb imparted to a whole generation of physiologists.

Moore was elected to the American Physiological Society in 1912; the society was 5 years younger than he. He remained at Berkeley as an assistant professor for 2 years and then went to Bryn Mawr. In 1916 he was appointed professor and head of the department of animal biology at Rutgers and in that same year was married to Mary Mitchell Chamberlain. She came from a distinguished and scholarly North Carolina family and was an undergraduate student at Bryn Mawr while Moore was on the faculty. She continued work for her Ph.D. in physiology at Rutgers and carried on her own research program during much of her married life. They had no children of their own but acted as foster parents for three children of foreign birth.

The summers of those first years at Rutgers were spent with Loeb at the Marine Biological Laboratory at Woods Hole. In 1923 Moore made the pilgrimage to the mecca of marine biology, the Zoological Station at Naples. This was the first of several visits, and he is even now warmly remembered there.

In 1926 he came to the University of Oregon as professor of zoology and settled into a way of life he was to follow, with only one major interruption, until his retirement from the university in 1948. The academic years were spent in Eugene, and the summers, at his home in Pacific Grove, just a block from the Hopkins Marine Station, where he held the post of lecturer from 1926 until 1954. Both homes were always open to the Moores' many friends. In the troubled times of the 1930's, when the Oregon State system of higher education was in the course of reorganization, he spent a year in Europe as a fellow of the Belgium Education Foundation, a year at Oregon State College, and a year at Tohoku Imperial University in Japan as a Rockefeller fellow. In 1934 he was appointed research professor in psychology at the University of Oregon, and he retained this post until he retired. When the biology department was established in 1942, the appointment was made a joint one. In 1946 he was invited to Brazil to present a series of lectures at the Oswaldo Cruz Institute and was awarded the National Order of the Southern Cross by the government in recognition of his scientific achievements. At the required age, in 1948, he retired from the University of Oregon, but not from academic life. For 5 more years he continued to teach and work at the University of Portland. Then, in 1954, still vigorous but tiring a little, he retired to a quiet life at Pacific Grove. His wife's death in 1960 was a severe blow. Moore remarried in 1961, but his health was failing, and after several weeks of illness, he died in Pacific Grove on 21 January 1962.

Arthur Russell Moore was a modest, kindly man, with an incisive wit, with broad professional interests ranging from cellular physiology to animal behavior, and with extensive cultural interests outside his profession as well. His courses in the physiological foundations of behavior and the history of science set a high standard of scholarship, while retaining marked popular appeal for undergraduates. He was a seeker after knowledge rather than professional status, a teacher whose ivory tower in scholarship was accessible to all. We who were privileged to know him personally will long remember him. His spirit will remain part of the living tradition of the university and of physiology.

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