

thews, librarian of the Carnegie Endowment for International Peace; Miss Margery Quigley, librarian of the Montclair, N. J. Public Library; Miss Sabra M. Vought, librarian of the U. S. Office of Education; Prof. Douglas Waples, of the University of Chicago's Graduate Library School; Watson Davis, president of the American Documentation Insti-

tute and chairman of the delegation. Others attending the Congress included: Dr. R. H. Draeger, surgeon in the U. S. Navy; Dr. Atherton Seidell of the National Institute of Health; Dr. J. T. Vance of the Library of Congress; Prof. Carroll D. Champlin of Pennsylvania State College; and Miss Jose Meyer of the Library of Congress.

Science News Letter, October 9, 1937

anything but a mighty structure for the comparison, reconciliation and synthesis of common guiding ideas for the whole world. What is gathered will be digested and the results returned through the channels of education, literature and the press to every individual in the planetary community.

Please do not imagine that I am indulging in any fantasy when I talk of your work and your accumulations as the rudimentary framework of a world brain. It is either that or nothing.

Mental Organization

I am speaking of a process of mental organization throughout the world which I believe to be as inevitable as anything can be in human affairs. All the distresses and horrors of the present time are fundamentally intellectual. The world has to pull its mind together, and this is the beginning of its efforts. Civilization is a Phoenix. It perishes in flames and even as it dies it is born again. This synthesis of knowledge upon which you are working is the necessary beginning of a new world.

It is good to be meeting here in Paris where the first encyclopedia of power was made. It would be impossible to overrate our debt to Diderot and his associates. It is good for the representatives from forty countries to be breathing the clear, comprehensive and systematic mental atmosphere of France, to be recreating themselves in the presence of its sympathetic constructive understanding.

Again I would thank our hosts for bringing this Congress together here and enabling a number of widely scattered workers to realize something of the true greatness of the task to which they have devoted themselves.

Science News Letter, October 9, 1937

DOCUMENTATION

Today's Distress and Horrors Basically Intellectual—Wells

“Race Brain” Can Now Be Duplicated and Preserved From Destruction; “Civilization is a Phoenix”

By H. G. WELLS

In an address before the World Congress of Universal Documentation, Paris

(Mr. Wells opened his address by explaining that he approached the work of the Congress from quite another angle than most of the other members. He acknowledged the admirable hospitality tendered the gathering and the energy and organizing power of Dr. Jean Gerard, president of the Congress, and his able associates. He said that he liked to think that he is a *precursor* of a growing appreciation of the necessity, importance and promise of the work of documentation by the outside world.)

I SAY I come in from quite another angle, whether I am an intruder or whether I am—as I like to think I am—a *precursor* of a growing appreciation of the necessity, importance and promise of your work by the outside world.

It is dawning upon us, we lay observers, that this growing work of documentation and bibliography, is in fact nothing less than the beginning of a world brain, a common world brain. What you are making, we realize, is a sort of cerebrum for humanity, a cerebral cortex, which, when it is completely developed, will constitute a memory and also a perception of current reality for the entire human race. This is exciting the imagination of some of us very greatly.

Plainly what is indicated is a unified and uniform organization.

Same In All Lands

Knowledge is the same in all lands and countries.

As Mr. Watson Davis is here to re-

mind us, it need not now have any single local habitation. It need not have the vulnerability of physical material centralization because the continually increasing facilities of photography render reduplication of our indices and records continually easier and cheaper. In these days of destruction, violence and general insecurity, it is comforting to think that the brain of mankind, the race brain, can exist in numerous identical replicas throughout the world in Peru, Iceland, Wales, New Zealand, as well as here in Paris. Workers in any part of the world may contribute to the growth.

At first our activities are necessarily mainly receptive. We begin most easily with the documentation of concrete facts, but *ideas are also facts* and I do not see how this new and great encyclopedia, this race brain whose foundations you are laying, can fail to develop into

DOCUMENTATION

How Documentation Promotes Intellectual World Progress

By WATSON DAVIS

(The address of the head of the American Delegation to the World Congress of Universal Documentation, Paris.)

THROUGH the daily, flowing, unending stream of the written and pictorial record of all phases of life, the peoples of the world have their best op-

portunity of knowing each other as intellectually motivated communities striving to progress and make the world a better place in which to live.

What a wide compass is included in this conception of “documentation.” Letters, periodicals, pamphlets, newspapers, books, business and official records, manuscripts, notebooks, motion pictures, radio transcriptions, phonograph records, photographs, drawings and paintings,

and even samples and specimens when words and pictures fail to convey full understanding. Documentation permeates the post office, the telegraph and cable systems, offices, libraries, archives, radio, museums, laboratories, chanceries and cottages, from the smallest collection of books and letters to the great institutions of world capitals.

Obviously documentation is truly universal, even in the literally astronomical senses since photographs taken through great telescopes now record the great stellar galaxies that dwarf our own Milky Way! Obviously also with such a field it is necessary to confine our aspirations and attention to the more immediate and practical aspects wherein there is some chance of effective international cooperation.

Intellectual Exchange

Despite the seemingly chronic disturbed state of the world, it is a hopeful fact that exchanges of intellectual intelligence are almost uniformly continuous and effective. Scientists of one country conduct joint researches with fellow specialists of another nation, even though the political and military leaders of those two nations may be glaring at each other. Librarians work with foreign libraries almost as though they were under the same flag. Such exchanges in the intellectual world make for optimism for the world's future.

One of the newer and most promising tools of documentation is the microfilm. Compact, to an extraordinary degree, promising to outlast our omnipresent paper, and capable of reproducing anything that the eye can see, even in natural colors, microfilms promise to hurdle some of the present barriers to easy and effective interchange of intelligence in many fields.

New Freedom

In many aspects the expert today is besieged just as effectively as Paris was in 1870 when the French photographer, Dagron, made the first microfilm and saw it flown out by carrier pigeon. The expert is ringed by high printing costs, by the scarcity of many publications published in small editions and not widely distributed, by inability to locate what has been published. Microfilm may very well lift this siege. It promises to give the specialist or research worker in science, both in its physical and more human aspects, in economics, literature, history and all other intellectual fields a new freedom in both publishing his own accomplishments and knowing what others have done.

Most immediate and practical to put into operation is the microfilming of material in libraries upon demand. It will become fashionable and economical to send a potential book borrower a little strip of microfilm for his permanent possession instead of the book and then badgering him to return it before he has had a chance to use it effectively. I believe that reading machines for microfilm will become as common as typewriters in studies and laboratories. If the principal libraries and information centers of the world will cooperate in such "bibliofilm services," as they are called, if they exchange orders and have essentially uniform methods, forms for ordering, standard microfilm format and production methods and comparable if not uniform prices, the resources of any library will be placed at the disposal of any scholar or scientist anywhere in the world. All the libraries cooperating will merge into one world library without loss of identity or individuality. The world's documentation will become available to even the most isolated and individualistic scholar.

Successful Operation

The practical nature of this project is indicated by three years of successful

operation of Bibliofilm Service in the Library of the U. S. Department of Agriculture. This fall this service will be extended to the Library of Congress, the national library of the United States, and the Army Medical Library, America's largest medical collection. America is ready to do its share in the establishment of a world net of bibliofilm services. Perhaps this can be best organized on a national basis, with one library or agency in each country undertaking to handle and route orders from other countries in the interest of expediting and making effective such interchanges.

Auxiliary Publication

Supplementary to the problem of making available existing literature is the securing of publication for all the material that should be recorded and made available to the intellectual workers of the world. In this microfilm can play an important role, giving publication with economy and effectiveness.

The microfilm can be used to secure what can be called "auxiliary publication." It will supplement other forms of publication and make accessible material of all sorts that can not now be printed because of economic factors. It will make available valuable research



NEW TOOL FOR READING

The reading machine for microfilm is expected to become as useful and prevalent in libraries, research laboratories and studies as the familiar writing machine or typewriter. The tiny images on microfilm are enlarged optically and projected on a translucent screen to more than original size.

data that now go unrecorded. It will make available out-of-print and rare books. It is adapted to the publication of photographs and other illustrations. Auxiliary publication service (which might be named Docufilm Service) should be auxiliary to established channels of scholarly publication and it should aid and not hinder journals. Editors of journals and institutions should act as intermediaries between the authors and the "Docufilm Service."

This idea has been given an experimental demonstration in America in connection principally with scientific papers. A journal editor publishes as much or as little of a technical paper as he wishes. In the case of a very specialized paper it may be only an abstract or summary. He appends to the notice or article a note saying that the full article with diagrams, pictures, etc., can be obtained by remitting a certain price and specifying the document number under which this full article has been deposited at the central agency operating the auxiliary publication service. Orders are sent by readers directly to this central agency, which is the American Documentation Institute at Washington, D. C. Microfilms of the document are made only if and when ordered. In this way the document is perpetually "in print" but no extensive, space-consuming stocks need be stored, only the document itself and the microfilm negative from which positives are made for distribution. The operation of the plan is simple and uncomplicated and editors may use it when, how and if they find it helpful. No financial participation or guarantees from the editor or author are required.

Docufilm Centers

It is believed that this or analogous techniques can be adopted in other countries, preferably with central agencies serving those countries. If this is done there can be effective exchange of negatives between "Docufilm centers."

While the plan of auxiliary publication suggested could be used with other methods of duplication, microfilm is the least expensive and most universal in that it will handle text and illustration.

Biblioilm and Docufilm are capable of immediate utilization. They can begin small and be allowed to grow as needed.

Another documentation project of importance to the world is much more formidable and cannot be accomplished without much planning, development and international cooperation. This is the possibility of a world bibliography, beginning in the field of science but

eventually extending to all fields.

The economy and compactness of microfilm gives new hope that a world science bibliography may be accomplished without ambitious hopes and promising plans being drowned in a sea of cards and smothered in a maze of details. It is possible to visualize the creation in some world center of a card file with a card for every article, paper, book or document published in science that is important to the written record.

When it is considered that most of the scientific literature of the world has been listed by title or abstract bibliography somewhere in abstract journals, in special bibliographies or such large card compilations as exist in the Science Museum Library at London, the task while gigantic does not seem impossible. The last and essential link in the possibility is the use of microfilm for

multiplying the cards under various classifications and in copying for distribution. I repeat that this is a large project needing international thought and probably years of gestation. Classification, the technique of bibliography and a dozen other factors in documentation to which many have unselfishly given their lives will find fruition in such a project.

I hope that such mere samples of the great possibilities of documentation development will convince the world at large of the importance of work in this field. Those of you who have organized this congress, and those who have worked for years in the upbuilding of the International Institute of Documentation need no convincing of the importance of this work to intellectual progress. It is a matter of world concern and international effort.

Science News Letter, October 9, 1937

GENERAL SCIENCE

Science Needs Synthesis As Much as Discovery

THE METHODS of scientific advance into new frontiers of knowledge are the methods of all great conquerors of military history; divide and then conquer. This was the message offered by Dr. Nolan Don Carpentier Lewis, director of the New York Psychiatric Institute, at the opening exercises of the Columbia University School of Medicine.

But Dr. Lewis added a pertinent warning. Along with the splitting of difficult problems into their component parts and success in solving the parts there must also be present a clear realization of the significance of what has been learned, and a blending together of all the knowledge. He continued:

"Sometimes I think men are needed who can arrange in synthesis the facts already discovered more than we need new facts. The organized specialists tend to dictate the direction of scientific research toward analysis and mechanism. There seems to be some lack of interest in the art of synthesis."

Even faith enters into the successful pursuit of scientific knowledge, Dr. Lewis pointed out, saying, "Faith also plays a role; not that faith which in the words of Sir Thomas More 'once wedded fast to some dear falsehood hugs it to the last,' but the faith in ultimate success."

"In interpretation," he concluded, "it

is necessary particularly to guard against a dangerous tendency of the human intellect—the tendency to accept as valid a plausible explanation and then look for the facts to support that explanation. No device however perfect yet discovered can wholly deprive the human intellect of its capacity to make mistakes, but many may be avoided by a cruel criticism to control thinking, and the development of a boundless caution in regard to all conclusions.

"Above all never refuse to see what you do not want to see or what might go against the views of authority. If one is naturally prone to form emotional prejudices and realizes it, he may by conscious effort succeed in becoming a shining example of fairmindedness. When a finding or idea is contrary to authority or even to common sense, it may be the clue to follow. Many discoveries are contrary to common sense.

"Uncommon sense is now needed in many situations. We should be stimulated by authority but not paralyzed—admire but not worship. Every advance in science has been at the expense of someone's reputation as an authority. The best plan is to keep the mind free—consciously keep it from crystallizing around formulas of any kind except as working hypotheses which it may be necessary to scrap tomorrow."

Science News Letter, October 9, 1937