within the boundaries set by the efficient working of the established pattern.

Looking at the animal kingdom from the behavioristic side, most animal activities are compounded of two factors: (1) innate and heritable factors (reflexes, instincts, and the like), and (2) acquired modifications of the inherited patterns (culminating in docility and intelligence). In some animal phyla the first component is dominant, in others the second. And the differentiation of an apparatus adequate for a highly refined and very elaborate instinctive behavior complex may preclude the development of the more labile modifiable types, as appears to be the case in insects, higher fishes, and to a less extent birds. The structural patterns serving the higher intelligent types of behavior have not been evolved from those lower brains exhibiting highly differentiated and stabilized inherited patterns correlated with complex instincts, but rather from more generalized forms which have remained more plastic (from the evolutionary standpoint) because less of their material has passed on into the mature form of tissue.

The higher forms retain their dominant position and continue advance in this direction because parallel with the elaboration of their stable, heritable nervous and instinctive patterns they retain sufficient labile nervous tissues of the "young" and plastic type to enable each individual to make his own adaptations to a great variety of environmental conditions and to profit by this experience.

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THE UNIVERSITY OF CHICAGO

EDUCATIONAL INSTITUTIONS REPRESENTED IN THE MELLON INSTITUTE

> "It is not so much to know how to direct research men as it is to know where to find them."—*Old chemical proverb.*

AN inquiry which is received frequently by the administration of the Mellon Institute is, "Where do you obtain your research chemists?" It is a familiar truth that there is a serious scarcity of men of demonstrated research ability; and since, *ceteris paribus,* the institute adheres to the policy of starting new investigational work only as competent men are available, the question is, therefore, of scientific interest. It can not, however, be answered except with certain conditional stipulations. In the first place, there is a diversity of opinion as to the basic qualifications for research, and particularly for industrial research. Then, there is the requisite of considering the exact nature of the investigation and the definite type of researcher needed therefore. And, finally, there must be borne in mind the fact that the finding of every research man is attended with difficulty because it frequently involves the gift of prophecy on the part of the searcher—or, at least, the application of a proleptic study which is at present in an inchoate condition. The supply of men capable of working at high efficiency as scientific investigators has been, and probably always will be, well below the demand; and scientists having the requisites and spirit of the researcher are, indeed, difficult to find even by ones widely experienced in the direction of research. Perhaps the most effective instrument for the recognition of investigational keenness is the comparative method, but the study of its use is still in its infancy.

On account of the extraordinary importance of new ideas, particular emphasis should always be laid upon locating and supporting brilliant investigators. Such individuals can best be found in the universities, although it should be the ambition of every research director to attract, rather than to seek, qualified scientific investigators. The function of the university is to operate with the beneficent idea of increasing the sum of human knowledge, and among its most valuable products are those young men of initiative who will work for the exercise of the investigative instinct and the pleasure of overcoming difficulties. Dr. Robert Kennedy Duncan once said:

That "good men" are scarce is, of course, a truism; but it is terribly apposite in these days. The modern manufacturer advisedly economizes in everything but salaries, and the very considerable salaries paid to "good men" are ample evidence of their rarity. Now, the purlieus of adolescent "good men" are the laboratories of the university. There it is that men are "tried out," and there it is, too, that men are known better than they know themselves.

Supporters of scientific and industrial research must aid in helping to establish a condition which will ensure a greater number of scientific teachers who are also trained as productive scientists. It can not be gainsaid that it is a highly desirable plan to arrange curricula so that every teacher whose favorite pursuit is research may develop it by the assistance of his students. The most important problem in industrial research today is not, how shall use be made of trained scientific investigators? It is, rather, how may there be produced annually active young students of science at a greater rate and of higher quality? And in this connection, thought must be expressed in terms of thousands per year of the type of trained men represented, say, by the doctor's degree or by two or more years of individual experimental work following the completion of appropriate undergraduate training.

The following list presents the institutional source of the incumbents of the Industrial Fellowships of the Mellon Institute from the time of its foundation in 1912 to the present day. It is the experience of the administration of the institute that a knowledge of the domestic history of the important research-schools facilitates the prognosis of the investigational possibilities of applicants therefrom. This information also renders less difficult the occasional quests for experts or research men possessing specific qualifications of a high order. Every large industrial research laboratory whose operation discloses telesis has received innumerable benefits from the establishment of cordial relations of cooperation with the various researchful university laboratories.

INSTITUTIONS REPRESENTED IN THE MELLON INSTITUTE, 1912–20

Names of Institutions	Degrees		
	B.S. and A.B.	M.S. and M.A.	Ph.D. and Sc.D.
Alfred University	3		
Allegheny College	4	1	
Amherst College	1	1	
Augustana College	1		
Beloit College	1		
Carnegie Institute of Technology	2		
Clark University	4	3	1
Clarkson College of Technology	1		
College of the City of New York	2		
Columbia University	1	1	1
Cornell College	1		
Cornell University	5	2	2
Dakota Wesleyan University	1		
Dalhousie University	1	1	
Delaware College	1		
DePauw University	1	1	
Dickinson College	1		
Emporia College			1
Fairmount College	1		
Franklin & Marshall College	1	1	
George Washington University		1	1
Harvard University	1		2
Haverford College	1	1	
Hiram College	1		
Iowa State College		1	
Johns Hopkins University	3		5
Kansas State Agricultural College	1	2	
Lafayette College	3		
Leland Stanford, Jr., University	2	1	
McGill University	2		
Marietta College	1	1	
Massachusetts Agr. College	1	2	
Massachusetts Institute of Technology	1	1	2
Monmouth College	1		
Muhlenberg College	1		
Nebraska Wesleyan University	1		
New Hampshire College	8	2	
New York University	2		2
Northwestern University		2	
Ohio State University	9	8	4
Ohio University	2		
Oklahoma A. & M. College	2		
Oregon Agricultural College	1		
Pennsylvania State College	2		
Purdue University	2		
Richmond College	1		
Ripon College	1		
Rose Polytechnic Institute	2	1	
Southwestern College	3		
Syracuse University	1		
Tuft's College	1		
Tulane University		1	

INSTITUTIONS REPRESENTED IN THE MELLON INSTITUTE, 1912–20 (*Concluded*)

Names of Institutions	Degrees		
	B.S. and A.B.	M.S. and M.A.	Ph.D. and Sc.D.
University of California	1		
University of Chicago	1	1	9
University of Colorado	1		
University of Göttingen			2
University of Halle		1	1
University of Heidelberg		1	1
University of Illinois	6	5 2 E.E.	1
University of Kansas	28	10	2
University of Kentucky	1		
University of Leipzig			2
University of London	2		
University of Missouri	2	1	
University of Nebraska	3	4	
University of North Carolina	1	1	1
University of Oklahoma	1	1	
University of Paris	1		
University of Pennsylvania	3		
University of Pittsburgh	14	14	13
University of Southern California	1	1	
University of Tennessee	1		
University of Toronto	3		2
University of Washington	2	2	
University of Wisconsin	3	6	2
Victoria University	1	1	1
Wabash College	4	2	
Wake Forest College	2		
Washburn College	1		
Washington & Jefferson College	2	1	
Wesleyan University	1		
Westminster College	1		
Wooster College	2		
Yale University	2	1	6

W. A. HAMOR

MELLON INSTITUTE OF INDUSTRIAL RESEARCH,
UNIVERSITY OF PITTSBURGH,
April 1, 1920

SCIENTIFIC EVENTS

THE CARDIFF MEETING OF THE BRITISH ASSOCIATION

ACCORDING to an article in the London *Times* the arrangements for the 1920 meeting of the British Association, which opens at Cardiff on August 24, are well advanced. The inaugural meeting will be held in the Park Hall on the evening of the opening day, when Professor W. A. Herdman, ex-general secretary, will assume the presidency in succession to Sir Charles Parsons.

Professor Herdman in his presidential address will give a general survey of the subject of oceanography, dealing in detail with certain special problems and recent investigations with particular reference to sea fisheries. On Thursday evening, August 26, an address will be delivered by Sir Richard T. Glazebrook, who recently retired from the post of Director of the National Physical Laboratory. The subject has not yet been fixed. The second evening discourse is to be delivered by Sir Daniel Hall, permanent secretary of the Board of Agriculture since 1917, whose subject will be "A grain of wheat from the field to the table."

The president of the mathematical and physical science section will be Professor A. S. Eddington, who recently came prominently before the public as a leading protagonist in the discussion on the Einstein theory of relativity. Dr. F. A. Bather is to be the president of the geological section, and his address will discuss the general problems of paleontology, especially in their relation to zoology. The presidents of the other sections, the subjects of whose addresses are not yet fixed are: Zoology, Professor J. S. Gardiner; geography, Mr. J. McFarlane; economics, Dr. J. H. Clapham; engineering, Professor C. F. Jenkin; anthropology, Professor Karl Pearson; physiology, Mr. J. Barcroft; botany, Miss E. R. Saunders; education, Sir Robert Blair; and agriculture, Professor F. W. Keeble.

The citizens' lectures, which developed out of the single lecture which used to be given to the operative classes of the towns visited by the association, are now arranged in collaboration with the local branch of the Workers' Educational Association. The lecturers this year will be Professor Boulton, of Birmingham, Professor Lloyd Williams, of Aberystwyth, Professor A. W. Kirkaldy, of Nottingham, and Dr. Vaughn Cornish. The president of the Conference of Delegates of Corresponding Societies will be Mr. T. Sheppard, curator of the Municipal Museums at Hull.

THE ENGLISH DEEP-SEA FISHERIES

A SPECIAL correspondent of the London *Times* who has visited some of the chief fish-