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A NATIONAL UNIVERSITY, A NATIONAL ASSET; AN INSTRUMENTALITY FOR ADVANCED RESEARCH[1]

GUIDING PRINCIPLE

AT the outset the guiding principle may be laid down that at Washington there is no necessity for a university of a type which exists elsewhere, no need of an additional university like the great endowed and state institutions of the country. One who advocates a national university at Washington with the idea that it shall be a larger Harvard, Yale, Columbia, Cornell or Chicago, a larger Michigan, Illinois, Wisconsin, Minnesota or California, will fail in his advocacy, because he can not give to congress a sufficient reason for the expenditure of public funds for another university of a kind of which there is a sufficient number. Not only would such an advocate be met by the above fact, but by the fact that in Germany, where universities are most highly developed, they are state, not national, institutions.

If then it is not desirable to establish a bigger Harvard at Washington, what is the aim of those who are advocating a national university? It is to make available for the advancement of knowledge the unparalleled facilities of Washington to graduate students.

At Washington are the Congressional Library, the National Museum, the Smithsonian Institution, the Geological Survey, the Bureau of Mines, the Naval Observatory, the Public Health and Marine Hospital Service, the Army and Medical Mu-

[1] Prepared for the meeting of the National Education Association, held in Chicago, July 6–12, 1912.

seum, the Office of Public Buildings and Grounds, the Board of Ordnance and Fortifications, the Bureau of Navigation, the Bureau of Education, the Weather Bureau, the Bureau of Animal Husbandry, the Bureau of Plant Industry, the Bureau of Chemistry, the Bureau of Soils, the Bureau of Entomology, the Bureau of Biological Survey, the Bureau of Corporations, the Bureau of Manufactures, the Bureau of Labor, the Bureau of the Census, the Coast and Geodetic Survey, the Bureau of Standards, the Bureau of Statistics, the Bureau of Fisheries, the Bureau of Immigration and Naturalization. In these and other bureaus and divisions are available a vastly wider variety of material for scientific research and greater collection of books and manuscripts than elsewhere exist. To enumerate in detail the facilities and materials available for work in each of the domains of knowledge would require more space than is allowed for this entire paper. Also, such a statement is rendered unnecessary because of the admirable report[2] regarding the matter by President Arthur T. Hadley, but to serve as illustrations some of the facilities for a few of the lines of knowledge are mentioned.

For the modern humanities—political science, political economy and sociology, there is a wealth of material in nearly every department. The Department of Labor, the Interstate Commerce Commission, the Census Bureau, the Bureau of Statistics, the Bureau of Pensions, the Bureau of Immigration and Naturalization and the Bureau of Corporations, are all applied divisions of political economy and political science. Nowhere else in the country is there such a mass of first-hand information regarding many of the most pressing problems for these subjects. Also the various government activities of Washington, comprising congress, the executive offices, the judiciary, and their numerous divisions and branches give illustration of practical political science on the largest scale. At Washington not only may the student of political science have the material of the subject, but also he may appreciate with what labor and difficulty results are achieved in practise.

For history, and especially the history of America, at the Congressional Library is a vast amount of material, indeed practically everything which is in printed form; not only so, but in the library is a vast collection of documents. In the State Department, the War and Navy Departments, etc., are the archives of the government since its foundation, all but a small part of which are available for the student of history.

For anthropology, the National Museum and the Bureau of Ethnology have collections and materials of the first order of importance; indeed no other collection of the country can approach them, with the exception of the American Museum of Natural History in New York.

For physics, astronomy and mathematics, there is a great mass of material in the National Observatory, in the Bureaus of the War and Navy Departments, in the Coast Survey, the Bureau of Standards, the Weather Bureau, the Patent Office and other departments.

In chemistry, there are laboratories in almost every department and bureau which deals with materials, both organic and inorganic.

For geology and its related subjects, geography, physiography and paleontology, at the Geological Survey and the National Museum is found one of the world's largest collections.

[2] "Facilities for Study and Research in the Offices of the United States Government at Washington," by Arthur Twining Hadley, Bulletin 398, U. S. Bureau of Education.

For biology, there are available the National Herbarium, the Biological Survey, the Commission of Fish and Fisheries, the botanical division of the Department of Agriculture, the National Museum and other departments.

Passing now to applied science: Almost every phase of advanced engineering work is illustrated by some division of the government. The material which would be especially available is that found in the War and Navy Departments, the Bureau of Mines, the Coast and Geodetic Survey, the Division of Architecture, the Hydrographic Office and the Land Office.

For agriculture, practically the whole department, except administration, is devoted either to the advancement of the science or to the dissemination of practical information. This great department has an appropriation for 1911 of more than $20,000,000, the larger part of which went for scientific and extension work. An enumeration of the divisions of the Department of Agriculture shows how wide is the scope of this work—the bureaus of Animal Husbandry, Plant Industry, Weather, Forest Service, Chemistry, Soils, Entomology and Biology.

While the Department of Agriculture has by far the largest appropriation for scientific work, the appropriations for scientific purposes in other divisions vary for each from more than $100,000 to more than $1,000,000.

While it would not be easy to give an accurate statement regarding the amount of money which is available in the various departments at Washington for investigation and for the tools of investigation—apparatus and books—it is safe to say that the total amounts to many millions of dollars per annum; or put in another way more than ten times as much as any single university or institution in the country for this purpose.

The vast collections of books in the Congressional Library and the large special libraries in the various departments, especially those of the Geological Survey, the Surgeon-General's Office, and the State Department, cover a greater number of fields of human knowledge with an approach to completeness than exists elsewhere in this country. These libraries are admirably administered. Expert assistants are available, so that the material on any given subject is readily secured. Not only so, but special privileges are granted in the reading rooms and in the stacks to qualified students. The facilities in these respects are incomparably beyond those of any library in other countries. It is safe to say that the collections of books in the government libraries at Washington could have an efficiency ten times as great as they now have at a small additional cost.

Manning the scientific bureaus and divisions are a scientific staff many times larger than in the largest university in the country. It is this amazing wealth of men and material at Washington that should be available for the production of scholars and investigators along many lines.

THE DEMAND FOR IMMEDIATE RESULTS

At the present time, unfortunately, the demands for immediate results by the government compel the great staff to give by far the larger part of their energy to special problems with reference to practical ends. The rich materials from the larger point of view of the advancement of science are in large measure neglected.

LARGE SCIENTIFIC RESULTS OBTAINABLE

If in each of the bureaus and departments mentioned there were advanced students working on the materials there exist-

ing, not with reference to the solving of particular problems which engage almost exclusively the attention of the existing staff, but with reference to the advancement of science, there can be no doubt that results of untold value would be obtained. It is believed that the utilization of this material in any bureau or department by a limited number of students need not interfere with the efficiency of the department in reaching the immediate results demanded by the government. Not only so, but it is believed that a group of advanced students, which in any department would not be very numerous, but which in Washington as a whole would aggregate a large number, could be made the means of greatly improving the work of the scientific staff of the various bureaus.

In making the statement that the bureaus at Washington yield relatively little in the way of broad scientific results, it is realized that there have been and still are some exceptions. When the United States Geological Survey was originated there were drawn to Washington the most brilliant group of geologists in the country. This survey for a number of years was the center of the world for the advancement of the science of geology; but in recent years, while the organization is vastly larger, having appropriations of millions where it had in the early days appropriations of hundreds of thousands, it is almost exclusively a department of practical geology. It is not contributing in any large way to the advancement of science.

That contributions of the Naval Observatory to science have not been large has been known for many years. In 1898 a report was made by a committee of astronomers showing that the practical duties of the Naval Observatory could be easily performed by a very small establishment. In this report it was pointed out that a national observatory is justified because astronomical observations and research might there be made which can not be accomplished at private and university observatories. The great new observatory building at Washington is splendidly equipped to carry on researches of the highest character; yet at the present time the advancement of the science of astronomy in this country is through Harvard, Yerkes, Lick, Mt. Wilson and other university and private observatories. The astronomers all agree regarding the first step necessary to remedy this situation, as does also the president of the United States and the committee on naval affairs. There should be appointed a civilian astronomer of the highest rank as director of the observatory. If this were done and the large facilities were made available to advanced students, this institution might take first place among the observatories of the world.

At the present time the advancement of science in its broader aspects is contributed to by only a few of the scientific bureaus at Washington, illustrated by the Coast and Geodetic Survey and the Bureau of Standards. On the other hand, in the universities of the country men are engaged in teaching and each year necessarily considering their subjects in the large, and immediate results are not demanded. These universities and the few independent research institutions, illustrated by the Carnegie Institution of Washington and the Rockefeller Institute of New York, are the chief centers for the broader contributions to science and learning.

THE RELATIONS OF TEACHING AND INVESTIGATION

It is my conviction, based upon many years of observation and experience, both in a university and in a department at Washington, that upon the average a man

produces the best scientific results who does some teaching. To give a course to a group of advanced students requires that a man go over the subject broadly. Even if the course be highly specialized, a man must consider his material, not only in its interrelations, but its relations to the other branches of his science. One who is a productive scholar scarcely gives a lecture upon a subject which he is investigating without illumination reaching him upon some point. There is nothing more productive of ideas than the presence and inquiries of young and earnest minds. A man who at Washington sits at his desk six days in the week, delving in his subject, often becomes buried in his material. Too frequently he never sees it from the outside. His material masters him instead of him mastering his material. The successful teacher must get outside of his subject, and consider its broader aspects.

I believe that the productivity of the scientific staff at Washington, even from the point of view of immediate results, would be improved during a given period, if each year the men of reputation were each obliged to give one set of lectures for at least a half year, either upon the subject under investigation, or some part of a science related to the investigation. The opening of the scientific bureaus at Washington to such students as are sufficiently advanced to take advantage of the material, and affording opportunity to members of the scientific staff each to give a course of lectures, would greatly improve the efficiency of the bureaus.

However, in order that the lectures may be successful, it is necessary that they be a part of the official duties of the scientific staff, not extra work for additional compensation. At the present time, because of the meager salaries, a number of men belonging in the departments give lectures in George Washington University or other institutions, thereby gaining additional compensation. This is an extremely unsatisfactory condition of affairs, in that it requires teaching to be done in addition to the day's work at the bureau. In order that lectures shall be efficient and the man who gives them gain the most inspiration and the largest broadening effect from them, they should be a part of his regular work. By the proposed combination under which a relatively small amount of instructional work would be given by any member of the scientific staff, I confidently believe that the work of the various scientific departments and bureaus, considering only the point of view of efficiency, would be greatly improved.

Thus in creating the conditions essential for the special national university which should exist at Washington, we should thereby increase the efficiency of the departments.

An incidental important gain which could come from the adoption of the plan proposed would be the training of men to fill the scientific staffs at Washington. Under present conditions, we know the staff contains many mediocre men. While this is partly due to lack of properly trained men of ability, it is realized that it is also due to niggardly pay, combined with the high cost of living at Washington. Too frequently a man who develops unusual ability in a bureau either goes to a university where he obtains better financial terms and more favorable opportunities for scientific work; or, because he can not decently support a family upon his salary, he goes into some profession or business in which he can apply the knowledge he has obtained in a department.

THE REQUIRED MACHINERY

We now have the fundamental facts be-

fore us. Not to arrange so as to utilize to its highest efficiency the vast wealth of material for scientific research at Washington is nothing short of improvident and reckless waste of great opportunities. It is a wrong to a member of the staff to demand that he grind away at his practical problem year in and year out without giving him a chance for a larger view through instructional work.

If the above conclusions be accepted, the next question to be considered is the machinery required in order to secure these desirable ends. It may be said at the outset that for the national university here advocated, while some money must be available, no large appropriations are necessary. The institution must have an executive officer. Under him must be a staff, the duty of which shall be to learn all of the scientific possibilities of the various departments and bureaus, to advise students who come to Washington, and to arrange for their work. It should be the further duty of the administrative force to prepare announcements of the courses of instruction which are to be given, with descriptions of the material available for such courses, precisely as is done by each in the universities.

The administrative force of the national university, if desired, might be associated with the bureau of education; indeed, this would seem to be a very natural association. If this suggestion be accepted, the administrative staff and bureau of education could both be housed in a single building and such cooperation established between the two as would be to their mutual benefit.

For the above work an administration building or a part of a building is necessary. Temporary quarters should be rented, and later, when experience shows achieved results warranting the expenditure, an appropriate permanent building should be constructed. In the administration it would be necessary to provide some lecture rooms, although the halls in the National Museum and in various other public buildings should be utilized for the larger lectures. The men who give specialized courses to small groups of students probably would prefer to give them in the building in which they work; for there would be the materials and the special libraries. This would require merely that each bureau or institution, illustrated by the Naval Observatory, the Geological Survey, the Bureau of Animal Husbandry, set aside one room of moderate size for lectures.

One of the obstacles in the way of the highest success of the plan is the insufficient housing of many of the departments; but the obstacle will gradually be removed. This is evidenced by a number of exceptions. At the Congressional Library there is ample space for all the students who may desire to come. In the magnificent new National Museum, where are associated the wonderful collections in geology, mineralogy, biology, anthropology, etc., are the most ample set of workrooms and laboratories anywhere in the country. Scores of students could there readily be accommodated without interfering with the effectiveness of the staff. The Naval Observatory has a splendid new building. The Bureau of Standards has adequate quarters. All these new structures have become available within a few years, and others will undoubtedly exist within a comparatively short time.

EXISTING LAW

Already the principles above advocated have been recognized to a certain extent by Congress through two enactments, the first in 1892 and the second in 1901.

Under these acts the scientific collections, museums and libraries of Washington and their other facilities were made accessible to scientific investigators and to advanced students, "under such rules and regulations as the heads of the departments and bureaus mentioned may prescribe."[3] Apparently the act of 1892 also contemplated that the advanced students who do work in the departments would have the assistance of the members of the scientific staff, for the preamble includes the phrase, "promote the work of education by attracting students to avail themselves of the advantages aforesaid *under the direction of competent instructors.*"

These laws have been taken advantage of to a small extent. As pointed out by President Hadley, their main service has been to men who are already trained for their work and are competent to carry on investigations independently of direction. These men have simply come to Washington and there used for their ends the material which the departments have afforded. For advanced students who still need the guidance of formal instruction the effect of these laws has been so small as to be almost negligible. Substantially the only exceptions are the one or two departments in which the scientific staff have voluntarily as a part of their duties given instruction either to the younger members of the staff in order better to fit them for their work, or to outside men. The best illustrations of this are furnished by the Bureau of Standards, the Public Health and Marine Hospital Service and the laboratories of the Bureau of Fisheries at Woods Hole and Beaufort.

EXPLANATION OF MEAGER RESULTS

That no large results have come from the acts mentioned, one of which has been a law for more than ten years, might be regarded as evidence that the position above taken concerning the desirability of making the opportunities at Washington available for scientific work is unsound. However, it is obvious that the failure of these laws to produce marked effect is due to three reasons.

1. There is no information published describing the facilities for research at Washington and the different lines of work which may be there profitably pursued.

2. There has been available no single bureau to which application can be made for the use of the facilities, no one to guide the work of the advanced students, no one to correlate the different lines of work. It is perfectly futile to suggest that a student go to Washington, enter a bureau, tell some official that he has come to take advantage of the provisions of the laws mentioned. This a man would not do; and if he did so the chances are that he would gain very little satisfaction by so doing, for he would be lost in the mazes of the bureaucracy. As President Hadley puts it: "The student who comes to Washington to-day to get his scientific training in the government departments comes under his own impulse and at his own risk."

3. For effective advanced work it is necessary that regular instruction be given. The existing laws do now provide for such instruction. If the proposal be accepted that members of the scientific staff be permitted as a part of their duties to give a limited amount of instruction, this fundamental necessity for successful advanced work is met. In this connection it is notable that in those instances where instruction has been given by the members of the staff, illustrated by the Bureau of Standards and the Bureau of Fisheries, the facilities for advanced instruction have

[3] Anno. Fed. Stat., Vol. II., pp. 860–861 (Edward Thompson Company).

been taken advantage of. It seems to me that these cases in which important scientific results have followed systematic instruction furnish conclusive evidence that if the principles applied in these bureaus were extended to other bureaus, the facilities and opportunities would be taken advantage of upon a considerable scale, perhaps as great as their facilities permit.

Therefore, if the opportunities for scientific work at Washington were as definitely described as are the courses in the catalogue of a university, if there was a central place to which a man could go to register and be guided to his work, if he could have an opportunity to have his work correlated, if he could have the assistance of the man with whom he wished to work, then I confidently believe that there would be a very large number of students who would take advantage of the unexampled collections and libraries of Washington.

To make these facilities still more available, it would be advantageous for the various universities of the country to cooperate with the Washington authorities. In the catalogue of a university it might be well to announce the particular lines of work and the advanced courses which could be advantageously taken at Washington best to supplement the work done at the university. Such cooperation would even more clearly emphasize the fact that the plan for a national university at Washington is not one to compete with existing universities, but to supplement them. Of course, no university could be compelled to cooperate as suggested, but it can scarcely be doubted that a large number would enter into cooperation, since so doing would be to the advantage of their students. Thus it is believed that the proposals made, if adopted, will result in a great gain to science in the country and also be of direct advantage to existing universities.

It is to be noted that the plan outlined does not include that of granting degrees. The fundamental thing advocated is that the country gain the advantage of the opportunities which exist at Washington, which they may do with comparatively little additional cost. To accomplish this it is not necessary that the departments undertake the task of examinations, the approval of theses and the awarding of degrees.

If there be prejudice against calling the institution above described a national university, it may be given some other name, since as a matter of fact the institution proposed would be different from any existing university in that it would not profess to give a complete system of courses regarding any subject, but would give such specialized courses as the facilities at Washington made advantageous; and also it differs from a university in the respect that it would not grant degrees. For my own part I do not particularly care whether or not the institution of which I speak be called a national university; but I am most anxious that the great opportunities at Washington, both in the way of materials and men, shall be available as instrumentalities for advanced research, and that this shall be a national asset.

PROPOSALS APPROVED BY STATE UNIVERSITIES

The proposals made are in perfect harmony with the plan for the establishment of a national university, approved by the National Association of State Universities. In the bill introduced into Congress with the sanction of the association, it is proposed that the essential idea of the national university be opportunity for study, not the granting of degrees. It is further proposed that no student shall be permitted to work in the various departments until he

shall have had the degree of master of science or arts, or equivalent training. This would require that a man shall have his first degree and shall have pursued graduate studies for one year and thus have gone far enough in advanced work to become qualified to begin a piece of special investigation. After a student has continued his work at Washington to the point where he should have a doctorate, he may take his examination and qualify himself for his doctorate at the institution at which he previously studied, and thus add to the prestige of that institution. Naturally, a part of such qualification would be a thesis prepared by using the material in the bureaus and departments. If the universities outside of Washington should cooperate with the Washington scientific staff, a student at Washington might be to a certain extent under the guidance of the university from which he came, and by this means his entire graduate work be made a harmonious whole.

NOT A RIVAL TO EXISTING INSTITUTIONS

Thus the proposed national university would not be a rival to existing institutions, but supplementary to them; not supplementary to one of them, but supplementary to all. In Germany it is the habit of students when studying for a doctorate to spend a part of the time at one university and a part at another. In some cases the work for the doctorate may be done at more than two institutions. The plan to have the departments at Washington available for advanced work would undoubtedly result in giving to many students a broader training than they now secure because of the fact that they would do a portion of their advanced work in a university and a part in the research departments at Washington. This arrangement would be most advantageous, for a part of the work would be done in institutions where the spirit is that of a university, and part in the bureaus where the spirit is that of immediate results; and it is the combination of the ideal and the practical in a man's education which gives the highest capacity for future useful service to the nation.

SUMMARY

In summary, (1) It is proposed that the unapproached wealth of books and materials at Washington for research be made available to the advanced students of the country having the baccalaureate degree and one year of graduate work or its equivalent.

(2) It is proposed that the scientific staff at Washington be authorized as a part of their official duties to give a limited amount of instruction.

(3) It is proposed to establish an administrative division, the duties of which shall be to make the facilities of Washington known and to guide the students to them. If desirable this division may be made a part of the Bureau of Education.

(4) It is proposed that a student completing his work for a doctorate at Washington be granted his degree from the institution from which he came.

(5) It is proposed that existing universities cooperate in this work with the departments at Washington.

If this plan be adopted, it can not be gainsaid that science in America will receive a great impetus; that the scientific bureaus at Washington will be inspired to escape from their bureaucratic bonds at least in some measure, and if so they will make larger contributions than heretofore to the advancement of learning. All the above results may be accomplished by a relatively small expense and to the mutual advantage of the United States departments and existing universities.

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