Course II.—Professor E. F. Miller, Professor G. Lanza, Dean Goss, of the University of Illinois.

Courses III. and XII.—Professor R. H. Richards and Professor W. Lindgren.

Course IV.—Professor F. W. Chandler and Professor J. Knox Taylor.

Courses V. and X.—Professor H. P. Talbot and Professor W. H. Walker.

Course VI.—Professor D. C. Jackson, Professor Elihu Thomson, Mr. Gano Dunn.

Courses VII. and XI.—Professor W. T. Sedgwick and Mr. Rudolph Hering.

Courses VIII. and XIV.—Professor C. R. Cross and Professor H. M. Goodwin.

Course IX.—Professor D. R. Dewey and Professor H. G. Pearson.

Course XIII.—Professor C. H. Peabody.

At the banquet on Saturday night President Maclaurin, President A. C. Humphreys, of the Stevens Institute of Technology, and Mr. John V. Bouvier will be among the speakers.

DISCUSSION AND CORRESPONDENCE

A NATIONAL UNIVERSITY AT WASHINGTON

THROUGH the courtesy of President Charles R. Van Hise, of the University of Wisconsin, the writer is just in receipt of a reprint from SCIENCE, of August 16, 1912, entitled "A National University, a National Asset; an Instrumentality for Advanced Research," the same being an address delivered by him at the 1912 meeting of the National Education Association.

The paper is a clear, comprehensive and practical exposition of the desirability and possibility of the fullest practicable systematic utilization, by those having the bachelor's degree with a year's subsequent practical work, of the extraordinary research facilities at Washington, embracing physical science and sociology (the latter including anthropology, political economy, political science and history), with such lectures by government officials as will direct the work to the highest efficiency. As such, the paper is a valuable contribution to the subjects involved, and is so excellent, as far as it goes, that the writer is reluctant to say aught in criticism, and does so only because the cause of education seems to require it.

The paper is not more noteworthy for what it advocates than for what it might be expected to advocate. Its negations are quite as marked as its affirmations. The first paragraph is as follows:

> 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 universities 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.

In the first place, the statement with respect to Congress is opinion only. In the writer's judgment, sufficient reasons *have* repeatedly been given to Congress, and if Congress has not been appreciative enough of the higher education, the fault has been not with the reasons, but with Congress. The mere fact that Congress has heretofore disregarded the proposals of the most distinguished committee ever constituted in an educational interest (although having a Senate standing committee on the University of the United States which in recent years has made four favorable reports, all but the third unanimous) is no reason for not continuing the campaign until Congress either recognizes the merits of the case or capitulates in the spirit of the unjust judge of Biblical parable.

As for Germany, it needs but be said that, if she has not yet attained the national university conception, she is on the way to it, and the German mind can be trusted to work out the problem of university education to its logical result.

And so the question reverts to the "guiding principle" of the paper. If the writer be not mistaken, there were Wisconsin colleges, excellent for their day, already existing when the

University of Wisconsin was inaugurated. What need, or "necessity," to use the word in the paper, was there for the institution over which President Van Hise is proud to preside? If Michigan, Indiana, Illinois, Iowa and Minnesota had state universities, and Wisconsin had none, would he not, as a resident of Wisconsin and an educator, not only advocate a state university for Wisconsin, but also wish it made as broad and strong as possible—if practicable, "larger" than the others? Indeed, would he deprecate the establishment of a first-class state university wherever there is none to-day? It is not likely. Then why discriminate against the District of Columbia, the nation's ground, and deny it the high privilege of an institution of the "university type," commensurate with the ideals, needs and resources of the nation?

He has faith in the "university type" of education in the states. He considers it there a very valuable and noble agency. But when he enters the District of Columbia his faith leaves him. What is the matter? Is not the nation but a larger state? Is the genius of the nation unsuited to the conduct of the fullest instrumentalities of education? Is the national atmosphere unsuited to that form of institution, the "university type," which both the reason and the experience of mankind in all ages have proven the most fit for the development of the higher learning, and which has served its purpose elsewhere so admirably? Apparently so. For, when he leaves Madison as an educator, he arrives at Washington chiefly as a scientist. What has transformed —contracted him? Has the spirit of the broadest learning, fostered in his northern home, become enervated by his removal to a more southern clime? Has the materialistic and commercial spirit of the age, which he withstood so nobly in Wisconsin, gained the ascendancy on the banks of the Potomac? Has he lost that priceless gift of the mind—vision? Whatever be the reason, his educational view has narrowed, and in the capital of his country, where, if anywhere, it might be expected to be comprehensive, it is principally limited to the sciences. Swedenborg, to be sure, saw that science, with all its uses, is but the husk of knowledge. But Swedenborg would be laughed out of a modern court of science. Science (unfortunately) has little use for seers. And so, for some unexplained reason, it is illegitimate, or unwise, or unsafe, or inappropriate, or impracticable, to do at Washington, in the name and with the support of the nation, what it is eminently legitimate, and wise, and safe, and appropriate, and practicable to do, to a less extent, at Madison, for instance, in the name and with the support of the state of Wisconsin.

Is President Van Hise any more a citizen of Wisconsin than a citizen of the United States? Does his ambition for American education halt at state lines? Would he have pride in no institution of the "university type" beyond the state and privately endowed universities? Are not these institutions, however great and strong, constantly seeking enlargement, and likely to continue to do so indefinitely? And yet do not they themselves recognize the significant fact that, with every increase of knowledge, the domain of the unknown, so far from decreasing, only expands to the view? If the first love of these institutions be for learning, why should not they welcome any new institution of the "university type," whether less or "larger" than themselves, calculated to assist in the search for truth—and welcome it the more in proportion to its power and importance? Is it possible that they imagine themselves, with their ever necessary limitations, the only institutions of the "university type" needed for the exploration of the boundless fields of knowledge? Can he be satisfied with them, or they with themselves, when a greater institution of the "university type" than any of them can ever hope to become may be created by the nation as a co-worker and helpmeet in the domain of universal learning? Can institutions of the "university type" be too numerous, or any one of them too "large" to realize the sublime conception of Johann Keppler, "the legislator of the heavens," when he exclaimed: "O God, I think thy thoughts after Thee!"? Will President Van Hise

mention a single argument, valid for a state university, that will not be at least equally valid for a national institution of the "university type"?

The state and privately endowed universities have done a noble educational work, and are contributing much to the advancement of American civilization. And it is no fault of theirs that they can not perform a nation's educational service. It is no disparagement of them that a national institution of the "university type" can do what they, either individually or collectively, will never be able to accomplish. It is the function of nationality to effect more than what is possible to lesser entities, and in no field of service can the national power confer a more signal benefit upon humanity than in the cultivation of the highest and broadest learning. In so far as a nation fails in this regard, it is especially recreant to its trust. And the educator can do his country no finer service than in persuading the nation to be true to itself by providing, in its own great name, the fullest instrumentalities for the pursuit of knowledge universal. Nor can these agencies be furnished in any form so well as by the establishment at the national capital of an institution of the time-tested "university type"—an institution analogous to the eloquent Charles Sumner's "grand temple of universal peace, whose dome shall be as lofty as the firmament of heaven, as broad and comprehensive as the earth itself"—such a university as was in the prophetic vision of the writer's recently deceased father, Ex-Governor John W. Hoyt, for the last nineteen years of his life chairman of the National Committee of Four Hundred to promote the establishment of the University of the United States, when he wrote:

> a broad and noble institution, where the love of all knowledge, and of knowledge as knowledge, shall be fostered and developed; where all the departments of learning shall be equally honored, and the relations of each to every other shall be understood and taught; where the students devoted to each and all branches of learning, whether science, language, literature or philosophy, or to any combinations of these constituting the numerous professional courses of instruction, shall intermingle and enjoy friendly relations as peers of the same realm; where the professors, chosen as in France and Germany, after trial, from among the ablest and best scholars of the world, possessed of absolute freedom of conscience and of speech, and honored and rewarded more nearly in proportion to merit, shall be, not teachers of the known merely, but also earnest searchers after the unknown, and capable, by their own genius, enthusiasm and moral power, of infusing their own lofty ambition into the minds of all who may wait upon their instruction; a university not barely complying with the demands of the age, but one that shall create, develop and satisfy new and unheard of demands and aspirations; that shall have power to fashion the nation and mold the age unto its own grander ideal, and which, through every change and every real advance of the world, shall still be at the front, driving back from their fastnesses the powers of darkness, opening up new continents of truth to the grand army of progress, and so leading the nation forward and helping to elevate the whole human race.

But President Van Hise apparently does not wish any such institution as that. He would have the state or privately endowed universities—necessarily the less competent agencies—attempt the broader educational labors, and leave the narrower work to the nation—inherently the more capable instrumentality. The greater field is too high and "large" for the nation. Some of the organic constituents of the nation, with other scattered agencies, can perform the national educational function better than can the nation itself. With all respect to the distinguished gentleman, the writer is impelled to ask, Could provincialism go further? His university attitude at Washington is what might be anticipated of a scientist, but is it what would be expected of an educator?

And so, why should *not* the nation establish, maintain and develop, in its name and at its capital, an institution of the "university type," calculated to become eventually the leading university of the world? The essential reason for such an institution, as has been shown, is, not that it may be "larger" than some other, but that, it being supported by the nation, the cause of learning and of truth will

be more fully served than will otherwise be possible. And this reason is not only legitimate. It is controlling. The claims of these high interests are paramount, and no lesser institutions or interests can properly be allowed intervention at the bar of American education.

A word on a subsidiary matter—degrees. The paper would deny to the national institution it advocates the power to confer them. Now, the writer assumes that President Van Hise desires for his proposed institution every agency that will contribute to its attractive force and its standing in the learned world. But will he say that degrees will not contribute powerfully to these important ends? Have not degrees in all ages been proven stimulants to study, certificates of attainments, and passports to practical opportunities in after life? Would not an institution lacking authorization to confer them be necessarily handicapped and lowered in the estimation of other institutions and hence its usefulness and honor be diminished? He of course appreciates the value of degrees both to students and to institutions, but he would confine them to the state and privately endowed universities. He says:

> After a student has continued his work at Washington to the point where he would 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.

A remarkable proposal—quite as surprising an anomaly as the paper's "guiding principle"! What would President Van Hise say if a student, after completing an undergraduate course at the University of Michigan, for instance, should take a graduate course at the University of Wisconsin, and then return to the University of Michigan for his examination, thesis and doctorate? Is it too much to say that the president of the University of Wisconsin would make a vigorous protest? And rightly. The laborer is worthy of his hire. Honor to whom honor is due. Fortunately, the spirit of equity among American universities would not permit such an infringement of university rights. But what he would resent for his state he proposes for the nation. He would give his state her dues, but in the case of the nation he would add insult to injury and put it off with a defrauded as well as a fragmentary institution. How will the spirit of equity among our institutions of learning meet such a real proposal as this?

Would a degree lose its value because conferred by a national institution? Indeed, would not its value be thereby indefinitely enhanced? And at the same time, would not the very fact that other institutions of the country were made the necessary gateways to the national institution operate to augment and strengthen those other institutions? If degrees are desirable for the University of Wisconsin or for Harvard, by what process of reasoning are they found undesirable for the national institution proposed in the paper? Is there more concern for the prestige of the state and privately endowed universities than for the prestige of the national institution?

Had the paper not laid stress on the "prestige" of the state and privately endowed universities of the country, the writer would say no more on that subject, for the word, as used, involves more than one unacquainted with the history of the national university movement would imagine. "Prestige," and its offspring, pride! There is pride, and there is pride, and they differ as darkness from light. There is pride which concerns individuals, as such, and which is loath to see any "larger" excellence than that rendered possible by its own circumstances. And there is pride with an eye single to the content of that which another is better circumstanced to accomplish, and individuals, as such, are forgotten in the greater good. Which form of pride shall characterize American education?

The paper is candid enough to admit that such an institution as it advocates would not properly be called a "university" at all. It says:

> 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.

The university title for such an institution would indeed be a misnomer and hence misleading and indefensible. The present writer, as is evident, has in view for his country a true national university. By the term "university," undergraduate as well as graduate work is generally understood, inasmuch as most of the work done in institutions bearing that title always has been, is, and ever will be undergraduate. As a matter of fact, however, the national university advocacy, almost from Washington's day to this, has been for an institution that would not be a rival to any others—for an exclusively graduate university —an institution that shall stimulate, elevate, standardize, coordinate and supplement American public education, utilize the government facilities, conduct government researches and investigate the unknown; inspire ambition for the highest learning, maintain cooperative relations with other institutions and increase their patronage by making its honors the goal of their graduates; foster nationalism, provide the educational facilities which Americans seek abroad, and, by attracting foreign students, diffuse democratic ideas—an institution that will, to an extent possible to none other, whether one or all, advance the cause of learning and give the United States a new and supreme dignity and influence.

The people of the District of Columbia are, indeed, entitled to an undergraduate as well as graduate institution of learning, and one of the former grade could be affiliated with the latter. But the District is a very small fraction of the United States. The supreme need is for learning and for the nation, for the highest and broadest institution possible of the "university type" at Washington—a need to be measured both by what the institution can do for learning and for the nation, and by what the nation can do for the institution —a need which, so far from decreasing with the growth of other institutions, increases with the years, as the nation becomes greater and as the infinity of truth is ever more fully realized.

There are offences of omission as well as of commission. It is bad enough to offend at all against one's country. But the paper under consideration, in presuming to set bounds to educational opportunities under the national name and auspices, and in the fullest and most fruitful form yet evolved—an institution of the "university type"—commits a yet graver offence—an offence against learning. No man and no set of men can afford even half-disloyalty to that sacred cause. The instrumentalities for the pursuit of knowledge may be circumscribed only to the ultimate disappointment of those audacious enough to attempt the curtailment of its beneficence. The temple of universal learning has no forbidden shrines or prohibited forms of worship, whether for an individual, a state, or a nation, and they who would pronounce any interdict there must reckon with the everlasting law of progress.

(Since the above was written, the writer has received a letter from President Van Hise, in answer to one remonstrating against the apparent lacks in the SCIENCE paper. President Van Hise says:

> In response to your letter regarding a national university, I have to say that I advocated the ideas presented in my paper with the belief that the steps there suggested should be the first ones. As a matter of practical expediency, it seems to me to be wise at the present time only to push for those ideas regarding a national university of which there is some chance of acceptance. If the steps I advocate were made at first, it is my conviction that the future would take care of itself. With a national university once founded, its growth would take place wherever sooner or later it appeared such growth would be advantageous to the nation.

If President Van Hise intends the institution he advocates as the beginning of a real national university, the author is gratified, but the paper gives no hint of such intention, with

respect either to its scope or its degree-conferring power—its constitution, in a word, as an institution of the "university type"—and, while it may be necessary to begin as he suggests, the writer deems it important to keep the ideal before the country, and so lets the paper stand as written.)

Kepler Hoyt

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Neo-vitalism and the logic of science

To the Editor of Science: In the discussion to which you have recently given space concerning the availability for science of the system of implications to which vitalism and the conception of entelechies lead, it is important to refresh one's memory concerning the general methodological postulates of science, for in the final analysis every special argument in such a case is nothing but the assertion of a specific point of view in regard to the system of conceptions with which science works in reducing the world of phenomena to order.

The conception of intelligible order is the product of a slow intellectual development which is reenacted by every human society in its progress toward civilization and by every child in its growth toward mental adulthood. Between the theoretical limits of a world of anomy and the assumption of necessary law the evolution of this concept presents an infinite series of modifications. The universal presence of law is the underlying assumption on which all investigation proceeds, and the advancement of science is measured by the field which it has redeemed from chaos and conceived in terms of intelligible order. But in certain of its relations this conception is scarcely more than a theoretical postulate which expresses a logical conviction as to the nature of the world and inspires the persistent search after new laws. It expresses the belief, in regard to each unreduced phenomenon, that the logical canons which have guided investigation to a triumphant conclusion in other fields must ultimately be found valid here also.

As to the phenomenal basis of such conceptions common observation sufficiently establishes the fact of recurrence, both of elements and complexes. Familiarity with these connections of experiences, however, does not carry the mind inevitably toward their uniformity. Man's first uncritical reflection leads only to the general expectation of recurrence. Failures and fulfilment must equally be accepted as facts. In one field order prevails, in another, caprice. It is an empirical inference which no more assumes necessary connection as its reflective postulate in the one case than it does anomy in the other. But the human mind is not content to rest at this stage. The world of phenomena is not a pure object of contemplation. It is endowed with energy and penetrated with living potencies and purposes, conceived in terms of agents and active causes. These spiritual powers in whom change is grounded are unique as well as individual, and each is marked by a characteristic activity. The world must be taken as it is found; if unpredictable as well as dependable successions occur, the causes to which they are referred must correspondingly vary. Arbitrary and capricious wills appear on the theater of events along with those which are consistent and inalterable. Wonder and miracle lie embedded in the world's structure alongside of established and predictable order.

The habit of thus conceiving phenomena in terms of disparate principles dies hard. It yields only before the slow extension of law as the investigations of science are pushed farther and farther and one range of phenomena after another is brought under control. At first it is not perceived by the scientist himself that the postulate of universal and necessary law underlies all his procedure, that the conception of uniformity is not confirmed by the slow accumulation of evidence but constitutes the basis of every conclusion he draws. The principle of all scientific method is established only when this relation is first clearly apprehended. As the connections of phenomena are more widely discerned the region of anomy undergoes progressive limitation and the world of miracle gives