ject to the constituting of an advisory board. They say:

If we were starting *de novo* it seems obvious that the whole of the national biological collections in and near the metropolis would be placed under one management. The Trustees of the British Museum are established by statute, and are partly selected and partly *ex-officio* members, more than one-third being high Ministers of State. Those to whom the active duties of management and superintendence are entrusted possess special knowledge in the various subjects illustrated by the collections, and they appear to us to be more fitted both by their experience and their position in the scientific and cultured world to be the governing body of the amalgamated botanic collections at Kew than any other that can be built up in their place. If those collections form part of the British Museum, the Director at Kew would become an officer of the Trustees in the same manner as is the Director of the Museum at South Kensington. It is true that in the report it is stated, 'Were Kew placed under the Trustees of the British Museum, unless their control were a merely nominal one, a thing in itself most undesirable, the demands of the Colonial, India and Foreign Offices on the resources of Kew would be subject to the control of the Trustees, a situation fraught with difficulties and dangers.' This assertion does not appear to us convincing. No example is quoted of these difficulties, the dangers are not indicated. It is far from clear why one controlling authority is more likely to produce them than a lay authority and a scientific authority with an advisory board interposed as a buffer between them. * * * We feel that the introduction of a new board such as is proposed is at least as likely to produce friction and difficulties as the present authorities, and will tend to weaken responsibility, and on this account, as well as because we do not attach much reality to the 'difficulties and dangers' which would arise from the substitution of the control of the Trustees of the British Museum for the present control, we dissent from the second recommendation of this report.

THE FUNCTION OF THE STATE UNIVERSITY.

Wherever in this paper the word university occurs, it means State university; wherever the word college is used, it means a private or denominational institution. Let me describe the function of the State university as it appears to me.

I. It should be *within:*

a. Non-partisan, but patriotic to the State and to the Nation;

b. Non-sectarian, but religious;

c. Free as to tuition in all departments, academic and professional;

d. Every inch a university.

a. While the obligation named first binds every institution of learning in our country, it binds the State universities in a peculiar degree. Their foundations are federal land grants. The funds for their maintenance come from their respective commonwealths. In the highest and broadest sense they should be nurseries of patriotism, but they should shun partisan politics as they shun death.

b. Non-sectarian, but religious.

The State universities have not yet realized their opportunity for developing in students a life that is religious and yet not sectarian. Freedom from denominationalism is apt to be construed as license to subordinate unduly religion in education. No good reason appears why the universities should not each maintain one professor at least to lecture upon sacred literature, natural religion and practical morals, and to serve as chaplain of the students. If, unfortunately, the law or Constitution forbids such teaching at public expense, an appeal should be made for an endowment

by private benefactions. What a blessing for a long time has Dr. Peabody been to Harvard. Such a man ought to be at every seat of higher learning.

Moreover, why should not a large State university maintain a department of theology, without which it is not complete and which does not belong necessarily to any denomination. In Germany, in spite of an established church, theology is non-sectarian. Men of all creeds go there for training. Why should not our American State universities show that ethics, religion and even theology of the highest and best type may be divorced entirely from denominationalism?

c. Free as to tuition in all departments, academic and professional.

This proposition ought to be established by the mere statement that in every commonwealth the university is the head of public instruction, which is free up to the higher learning and ought to be free there also. The reasoning that people have indulged in as to free tuition is very curious. In early times the doctrine was preached that schools should be maintained at public expense, but should be limited to the elements of learning—reading, writing, arithmetic, geography and United States history. A little learning the public might give the individual, but no more. After strenuous opposition, this doctrine was established in New England, in the Middle States, in the West, and finally in the South. Then came the second step forward, in which in many places high-schools were smuggled in. In Kansas City, for example, the first high school, now one of the best in America, was for years maintained rather surreptitiously. Later the people throughout the union came to the belief that a chance at secondary education also, without charge for tuition, was due from the commonwealth to every soul on its soil; but it was still argued generally that college or university training should be paid for by the individual. Not long ago, some Western States reached the third stage of progressive belief that free instruction should be given through the college of liberal arts, but that professional training should be paid for. In the process of evolution, however, the fourth era is near at hand, in which it will be recognized, I think, that the discrimination between academic and professional instruction is wholly specious. If it be granted that the State owes to every soul on its soil a chance at free instruction through the college of liberal arts, by what legerdemain of logic can it be denied in medicine or engineering? In these so-called professional courses perhaps half the studies are academic, and the other half are applications of the academic. Is it reasonable for the State to teach a man freely physics, chemistry, mechanics, drawing and mathematics, but refuse to teach him freely their applications to engineering? Should one learn at public expense, such academic subjects as physics, chemistry, neurology, embryology, anatomy, histology, physiology, physiological chemistry and bacteriology, but learn at personal expense their applications to medicine? All such reasoning is to my mind artificial. It is said that law, medicine and engineering are gainful pursuits, and, therefore, the beneficiaries should pay for training in them. The argument is not worth refuting, but, if it were, it might be pointed out that bachelor of arts is a gainful degree. Moreover, academic graduates are not more useful to the people than are lawyers, physicians, pharmacists, dentists, engineers, etc., of superior quality. As soon as you admit that the commonwealth must furnish its people free instruction in any degree you are compelled to admit that it must furnish free instruction in every degree and in every useful form. But the same argu-

ment, it is said, might be advanced for free clothing or board or books. To my mind this does not follow at all, but if any man will demonstrate that they should be furnished in any stage of education, it would be easy to prove that they should be furnished in every stage thereof and in every useful form.

It is questionable whether, in view of the superb training at Harvard, Massachusetts is bound to found a free university, but in my opinion she is bound to give her citizens that desire it and are prepared to receive it free instruction in some accessible university of high rank. Whether free tuition should be extended by one State to citizens of another is a question that I will not now discuss. Those who, like the writer, exalt the Nation above the State will favor it.

In closing this division of my subject let me say with emphasis that free tuition in any department without high standards of admission and of graduation is akin to crime.

d. Every inch a university.

There is danger that through eagerness to take in new territory, to swell enrollments, and to provide instruction for special classes, some of our universities may forget that to deserve richly their titles is the highest obligation they owe to the people. Policies of expansion and adaptation are sometimes commendable and occasionally are forced upon us by circumstances, but they take money and subtract from the energy due to higher teaching. Never should they be allowed for a moment to obscure the main purpose, which is to be from circumference to center a great university. Particularly objectionable is the tendency too often exhibited to swell enrollments by adding professional schools in the nearest metropolis. These *morganatic* unions rarely bear good fruit. A university is much more than a college or an aggregation of them. Its great work is graduate and professional studies based upon an academic degree. To attain this end is far harder when the work is not concentrated on one campus.

II. The university *without* should care for the State and should serve as a buttress to a National University.

It has been preached strenuously that the State should care for its university but scarcely has the idea been broached that the university should care for the State. It is possible to do this in a variety of ways, in material, in social, in political and in spiritual things. The possibilities in spiritual things have been discussed in the second paragraph of this paper. What can a great seat of learning do for the public good in other directions?

a. Through the College of Agriculture, or in conjunction with it and other public agencies, it should look after the material welfare of the people.

The loftiest learning should not scorn to help men in their material interests. If in its laboratories a dietary can be discovered whereby the fattening of swine is made cheaper to swineherds, the university should promulgate that dietary. The Babcock Milk Test, discovered at the University of Wisconsin, has been a blessing to dairymen in all the world, and almost as beneficial to another class of husbandmen has been the discovery in the University of Missouri of a method of inoculating cattle against Texas fever, whereby the mortality in blooded animals carried south has been reduced from ninety to less than eight per cent. Our colleges of agriculture have devised better dietaries for domestic animals than the wit of medicine has yet invented for growing children.

Expeditions have been sent out by our universities to measure accurately remote water power and to survey routes for transmitting it electrically to railway stations; to measure beds of coal and test their ther-

modynamic values; to measure beds of cement and quarries of stone and try their quality; to collect flora, fauna, rocks and minerals; and for other useful purposes. The results, carefully tabulated, have been widely distributed. Diseases of animals and plants have been held firmly in check. What has been done shows what may be done for things material by the scientific skill of universities. But what has been accomplished has been mainly along the paths prescribed by the United States, in the Hatch Act, establishing Agricultural Experiment Stations. Except under federal leadership, our universities have not done very much, I fear, for the material welfare of the people, when one considers the immense possibilities.

b. In collaboration with State boards, bureaus and commissions, the university should look after social and economic conditions.

How many States can point with pride to their penal institutions—their jails, penitentiaries, reformatories, almshouses, tenement houses and asylums? Yet the university of each commonwealth perhaps maintains a chair of sociology. On the campus are students from every county. In their summer vacations they could visit every reformatory and eleemosynary institution, reporting accurately its condition. A judicious publication of the results, with a statement of fundamental principles, would lead often to radical reforms in the treatment of the criminal and defective classes.

No State is without municipal problems and few can boast of a rational system of taxation. Why should not the department of economics take up these subjects? If the professors understand what scientific taxation is, why can they not apply it wisely to prevailing conditions? The wisest teaching of political economy in municipal problems should be spread broadcast. The Federal Government maintains in every commonwealth an Experiment Station to find out what is wise in agriculture and to disseminate among the people the knowledge gathered. The departments of sociology and political economy ought to be experiment stations after their kind in the full meaning of the Federal Government, and the university should not begrudge the cost of publishing and distributing among the people whatever information may be necessary to enable them to adjust wisely their systems of taxation, to solve municipal problems, and to improve the condition of their penal institutions, reformatories, asylums, almshouses, tenement houses, etc. It is the function of a university to investigate, to teach and to publish.

A painstaking study of the State laws, in the light of the broadest learning and in comparison with other codes, if embodied in timely publications and spread broadcast, would not be without good results anywhere. The achievements of David Dudley Field in this direction are well known.

The early history and archeology of every State is an inviting field for investigation, while the editing of early local writers of the better sort might well employ some of the literary skill of the faculty. A *spicelegium* in some cases it might be, but in every case it would be valuable.

The departments of chemistry, sanitary engineering and medicine find a wide field of usefulness in things pertaining to public health: pure foods and drugs, pure water, good sewers, the ventilation of buildings and so on. In this broad direction it is possible by scientific work and by helpful publications to diminish sensibly the rate of sickness and of death.

c. In cooperation with boards of education and the State Superintendent the university should build up the schools below it.

The writer has talked on this subject so often that he feels inclined now to dismiss it hastily. Elementary schools cannot be brought to efficiency, unless there be high-schools to lead them, and high-schools cannot become ideal without the help of a university. The whole system of public education from the kindergarten to the graduate department, and through it, should be strongly knit together. This principle is accepted universally, the chief discussion being about instrumentalities. My own experience causes me to place high value upon examiners of schools appointed by the university. The examiner should be an instructor or assistant professor of pedagogy, and should lecture sometimes on the campus. In large States it might prove convenient to have an examiner for town high-schools, another for rural schools, and a third for elementary schools. The examiners should all be extension teachers of practical pedagogy. Their function is not so much to examine as to build up. If the university will pay for the cost of this service, the money will come back two-fold. As an example of what may be done by an institution for the schools below it, let me point to the University of the State of New York. Few universities could engage in all its manifold work, but according to our means we should adopt its best methods. Traveling libraries and galleries and extension lecturers as well as examiners of schools are educationally important means of grace.

Moreover, the university is not without obligation to the private and denominational colleges which, chartered by the State and protected by its laws, teach a large percentage of the educable youth. It is a blunder of the first magnitude to assume towards these colleges an attitude of hostility. One of the best things that we have tried in Missouri is the College Union, consisting of the University, and of every other respectable institution of higher learning. At the meetings, held at each institution in succession, we discuss common problems, talk of common troubles, and help one another to the common end—the uplifting of the people. In spite of provoking opposition occasionally from the churches, any university should be held largely responsible if bad feeling continues between the denominational colleges and itself. Stepping grandly over small animosities, it should remember that, while officially it is the head of public instruction alone, in a broader sense it should be the loving helpful head of all sound education in the commonwealth.

The State university should serve as a buttress to a National University.

Education will not be complete in these United States until we have at Washington a national university with State institutions as its buttresses. Some day our education will conform to our system of government. I for one would not be willing to see institutions of any class enjoying privileges in the national university that are denied to other institutions of equal or superior grade, but close affiliation between the State and nation seems inevitable in education also.

In conclusion let me answer some possible objections to the positions taken in this paper as to the outward obligations.

Should the university invade the provinces of the boards, bureaus, and commissions—the Geological Survey, the Natural History Survey, the Health officers, the Tax Commission, the Superintendent of Public Instruction, and the College of Agriculture and the School of Mines, if, unfortunately, these stand on separate foundations? If the interests of the State are adequately served by others, the university might let well enough alone. Under no condition should it officiously invade the territory of any officer or organization appointed by

the State. But ninety-nine per cent. of the difficulty will disappear if only the university will do the work admirably and let others take the credit. If the purpose be to promote public welfare why should one care who gets the praise? In every instance, hitherto, in the writer's experience, the scientific, philanthropic and statistical departments of the State and the nation have been eager for cooperation, wherever the university has demonstrated ability to do work superbly, and in most cases they have supplied the money. Besides, it is one thing to appoint commissions and quite another to induce them to fulfill strenuously the purposes for which they were appointed. Many a yawning gap of deficiency in public officials may be quietly bridged by the patriotism and skill of the university, which should be the eye of the people, searching in every direction for opportunities to serve their welfare.

Will not the discussion of social and civil questions embroil the university in partisan politics? The most important problems of sociology and politics are not often embodied in State platforms, which usually consist of the national structure with a few more planks lauding one party and vilifying the other.

Do you ask where the money for all this is to come from? False to the core is the idea that the resources of a university are solely for instruction on its campus. The administration has no right to wait always on needed investigations for special appropriations from the Legislature. It should rather assume that in part the income must be consecrated, as need arises, to promoting the public good wherever it can be reached by scientific skill. Ultimately no use of money will pay better, even as an investment of capital. At last, we are not required to do more than our resources permit. It is the spirit that maketh alive. The important thing is for the university to construe its functions liberally and to choose intelligently what can be done now and what should be postponed. Time as well as money is necessary for perfect performance of its whole function.

In conclusion, let me say that the State University, founded by the Federal Government and supported by a mill tax upon the property of a great commonwealth, with broad outlook and intense devotion to the welfare of the people, can be made the best institution yet devised by the wit of man for the promotion of human progress. University mottoes are sometimes inspiring, but the one that appeals to the writer most is from Cicero, De Legibus—'Salus Populi Suprema Lex.' The welfare (salus), construed broadly, is coextensive with public interests, which, beginning in the soil of earth and rising through human society, mount upwards finally to the Kingdom of Heaven.

R. H. JESSE.

SCIENTIFIC BOOKS.

Le système métrique des poids et mesures. Par G. BIGOURDAN. Paris, Gauthier-Villars. 1901.

A hundred years have passed since the inauguration of one of the most important reforms yet undertaken by civilized man, considered as to its far-reaching effects upon social, economic and scientific interests and conditions. Although the establishment of a universal and uniform system of weights and measures among all enlightened nations is not yet an accomplished fact, that most desirable end is so nearly reached that no reasonable person can for a moment entertain a doubt as to the final result. Only two great nations, constituting the English-speaking people of the world, still hold out against the irresistible movement in favor of uniformity of standards and they are both wavering very decidedly, preparatory to the inevitable yielding which the most thoughtful of their people are endeavoring to hasten. During the last decade in both England and America popular interest in the subject of