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Presidential Address - The Academy and the People

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PRESIDENTIAL ADDRESS.

THE ACADEMY AND THE PEOPLE.

BY PROF. T. H. MACBRIDE OF THE STATE UNIVERSITY.

Gentlemen of the Academy:

Again, by the decrees of fortune, I appear before you as your presiding officer to extend to you the felicitations of the season and to congratulate you on this, our annual reunion. It is a fortunate thing that so many men can thus come up each from his own field, here to meet in friendly converse with his friend of like pursuit, of like employment, each to derive encouragement and stimulus for further and happier endeavor. This evening there are many reasons for special congratulation. Our roll of fellows and members is longer than ever before; our program shows a more general and widespread interest; every department of scientific work in the state would seem to be more assiduously cultivated than has hitherto been the case.

Let us hope that the enthusiasm which has thus far marked the progress of the Academy, and especially distinguishes the present session, may continue until every man of science in the state shall appreciate and feel its uplifting power. We ought to fill the largest hall in this city, and the time approaches when we shall.

It seems less necessary to enumerate here a list of the papers and publications of our membership during the year that is gone. Many of the more important are before you in the latest volume of our printed proceedings. Suffice it to say our members and fellows have not been idle. Some have been honored, and in their honors we rejoice to share, by transfer to wider fields and opportunities new, in other and distant states.

Our worthy secretary, Professor Osborn, to whose enthusiastic effort, more than to any other one thing the success of the Academy during these recent years is due, has already for

some months occupied the chair of zoology in the University of Ohio; Professor Hall occupies the chair of mathematics in the University of Kansas City; others are in still more distant states; one whose name is on our program is with the army of occupation in Cuba; and one, be it softly spoken, as is fitting, has gone on to his reward eternal. The sods of this, his newly adopted state, rest lightly yet above his fresh made grave. Charles Ashmead Shaeffer died September 23d. It is most proper that in the midst of our felicitations, in the gladness of our reunion, we should for a moment pause to lay upon that grave the wreath of grateful memory. Though, by his unceasing labors for the institution he so nobly served, he was in large measure deterred from actual participation in the work of this Academy as such, nevertheless, we always knew we had in him a sympathetic friend, and his constant attendance at our sessions was an inspiration to us all. Dearest to those who knew him best, the members of this Academy will mourn his untimely departure and grieve over their irreparable loss.

The report of the secretary and treasurer shows that the finances of the Academy are in satisfactory condition. Indeed, since the state has assumed the cost of publishing our proceedings, our expenses as a society are limited largely to the outlay incident to our sessions; printing, postage and matters of an incidental nature. However, the result is that while not a royal society, not under the patronage of the king nor of anybody in particular, we are, nevertheless, as suggested here last year, not quite independent; we are under obligation; we are in a sense bounden to the people of Iowa and it has seemed to me that it might be worth while for us to consider for a little time this evening the kind and amount of return which the people of the state may reasonably expect for their investment.

In the first place, the very existence and activity of such a body as this Academy is a factor of no small moment in the intellectual life of the community. Great universities in some parts of the world may exist, glow along for centuries, side by side with the greatest penury, superstition and intellectual night; within a mile of the University of Bonn I have seen a man ploughing with the family cow, while his wife and children, hard by, made hand-made brick in the open field. But such a situation fortunately is not possible, we may believe, in

America among our more active people. The influence of a great intellectual center is not limited to the roster of its organization. The University of Michigan has educated the whole northwest, has influenced you and me, though we may never have seen its stately halls. And so I take it with an Academy like this; its work is far-reaching as the state among our own people, and far-reaching as science among the nations of the world; this by mere virtue of its existence, and all apart and distinct from the work it has been able to accomplish. The spectacle presented year by year of from three to four score, or more, intelligent men assembling at their own cost to discuss themes which offer no pecuniary returns, present or prospective, is at least sufficiently significant in this mercenary age of ours to demand attention. But there is something more. The problems we here discuss escape at length these halls, reach the public press, the firesides of the common people, and then who shall estimate the wide influence of the Academy as a constant impulse to intellectual life, more and more manifest and in every way most potent. Every discovery made by any member of this Academy, every new list of plants, every new bed of clay, every planed pebble or fossil tooth, every public discussion of printed report, stirs as nothing else the intellectual life of the community where such discovery appears or is reported, and redeems such segment of our population, in so far, from that fearful stagnation into which, apart from such stirring, humanity is so prone to fall. Our present popular and highly successful geological survey reaching as it does one after the other, in a most efficient way, every county in the state, is doing a wonderful work in the direction indicated, and I believe it is not too much to say that that survey is in a large measure due to the suggestion and organized effort of this Academy. At any rate, the survey is but carrying out in a more methodic and systematic way the work which has constantly largely engaged us here.

It is well for us thoroughly to understand this matter and betimes to put it clearly before the world. There are, as all history testifies, but two possible attitudes of the human mind; the one responsive to the stimulus of the external world, an attitude of inquiry, effort, search after truth with consequent ennobling glorious progress; the other an attitude of resignation, inactivity, a study of death rather than life, with resultant torpor, dry rot, necrosis of every noble power. If the

attitude of Americans thus far has been the former, the cause is not far to seek. The opening up and exploitation of a new continent has up to this time kept our people alive as have been no people elsewhere on the face of the earth, perhaps in all historic time; but that particular form of stimulus is passing. We are fast settling into conditions which are paralleled by the older nations of the world; I may not detail them here, but we all know that the stimulus of natural newness is passing, and I need not tell this audience that in the organized efforts of scientific men, in academies and royal societies, lies the only hope of the promethean fire. Such institutions are the open court of intellectual progress, the focus of inventive life. They, and they alone, foster and feed the inventive spark that shall at length blaze in the open field of discovery. Literature is glorious; but on occasion she hides in cloisters for a thousand years, while outside her gates all the world may slumber; art is wonderful; but art, too, is hemmed in by narrow, self-determined limits; philosophy is reflective, and is wont to lose herself in some far off Nirvana; it remains for science, for science only, to find for the human mind employ unceasing in duration, unlimited in scope, far-reaching in inquiry, beneficent in its purpose, touching with blessing the king in his palace, the poor man in his home, the savage in his hovel. Literature has no new themes. She still seeks her models in the millennia of the past, and turns the kaleidoscope worn by the service of three thousand years; philosophy attempts to reason upon data confessedly uncertain, and accordingly from century to century makes little progress; science alone finds problems forever new, bases her conclusions upon facts subject to constant verification, so that in an academy such as this there is perpetual reminder that the bounds of human knowledge are widening, and are yet to be enlarged.

In no college, in no university, however well organized, do we attain the same result. In a university every phase of human learning has its appropriate place and receives equal consideration; here the scientific method has full sway, naught enters to distract or to disturb, and in the light of friendly criticism each finds the help and encouragement of the other in the sifting of truth or the proclaiming of fact already ascertained.

In the second place, an academy such as ours is of highest

service to the state, in the fact that it is a perpetual protest against false science, science falsely so-called, insanity and nonsense of every description, into which civilized people are apparently so easily and constantly led astray. I think that I speak with the approval of most students when I say that the common people stand to-day more in need of our methods than of our facts. The habit of trusting only to accurate and oft repeated observation, the habit of correlating fact with fact, the habit of appealing constantly to some independent check, or verification, of accepting nothing that does not pass the ordeal of such scrutiny and test, such habit, if it could be imparted to our people now, and once for all, would certainly be of more value to them by far than all the facts we are likely to set before them for many a decade. The credulity, the absolutely infantile credulity, of some of our most intelligent people surpasses belief. The fact that "truth lies at the bottom of a well," that its attainment is difficult in the extreme, never occurs to most men, apparently, at all. The song of the veriest charlatan meets readier credence than the voice of the laborious student. Accordingly one craze, or form of infatuation after another, sweeps over enlightened humanity. Forty years ago it was spiritism or spiritualism; to-day it is Christian Science. I leave the Christian apologist to disown the first portion of the binomial or not, as it may seem to him good; but I for one protest against the use of the word science in any such connection. Surely science has been long enough in the world to stand for something real in court, to possess a character and a reputation that has standing; surely science is entitled, once for all, to be relieved from the imputations of modern superstition and self delusion. The one thing for which the man of science strives is the ascertainment of facts, as these are appreciable by the senses aided by all instruments of precision; the one thing that so-called Christian Science denies, and all the while refuses, is what the senses of man declare to be a fact. There can by no possibility be science here where truth is studiously excluded and yet thousands of Americans, possibly hundreds of Iowans, are to-day inclined to spend their money and their time in pursuit of this latest delusion in the mirage book of time.

Of course I shall not be accused of refusing to my suffering fellow-man any form of solace which humanity, individually or collectively, may possibly bring to aid him; but let us have no

confusion; let us call things by their right names. Let mental, nervous and all sorts of more or less imaginary ailments be treated as the symptoms indicate; let effect be linked to appropriate cause as elsewhere in physiological research, and scientific methods may, at length, discover all attainable truth; but, let no man, forgetful of every principle of scientific procedure, and oblivious to its very first requirements, heaping up rubbish from the deservedly forgotten idealistic philosophy of the middle ages, go forth in the name of science to proclaim that there is no pain; that there is no disease; that there is no bodily ill; that "all, all is mind!" Science knows him not!

That such delusions find lodging among most excellent people, in no wise affects the case. The remedy lies, I shall still maintain, in the inculcation of real science which insists on the ascertainment of truth, and especially in the application of the method of science which trusts the evidence of the senses acting in their normal province and in a natural way. But is it not astonishing that almost every ancient delusion that aims nowadays to lift its head among enlightened men assumes to speak in the name of science, thus unwittingly paying tribute to the reputation which the scientific movement has made for itself in the world? Thus we have "occult science," strange contradiction of terms! and "esoteric science" and "mystic science" and "monistic science," "spiritualistic science," "theosophic science," and I know not what. Surely science has difficulties and perplexities of its own to deal with, sufficient that it may be allowed to protest against the imposition of such a burden of unheard-of accumulated rubbish. I repeat; the only remedy for false science is true science; the only knowledge that will save people from the constant recurrence of dominant superstition is found in that form of human knowledge and activity which this academy is set to foster. Literature will not do it; art will not do it; even religion, divine though her mission be, will not do it; has not done it. Her gospel seems to assume the spread of another gospel, that of common sense, and the gospel of common sense is modern science. If our people could once get into the way of looking at things as they really are, and judging the natural world on the principles of simple, clear-eyed, common sense, wisdom would at last be justified of her children.

But there is still another phase of the situation which I think ought to be mentioned here to-night. There is to-day, at

the end of the century, in the intellectual world everywhere, plainly a reaction against the distinctly scientific method of acting and doing. Thirty years ago, twenty-five years ago, science seemed about to sweep everything before it. Every phase of human thought was roused in a second renaissance, more far-reaching, and, as I think the future historian will declare, immensely more pregnant of result than was that earlier revival of the sixteenth century. But thirty years have passed and now the trend is different. The freshness of the impulse is to most of us a memory; the world of thought has begun again to crystallize and although the force of that first upheaval is by no means spent, shores and continental outlines are all different from what they were before, nevertheless old tendencies, old ideas, old superstitions even, as just noted, are beginning again to lift their heads. The scientific movement as represented by this Academy is at an ebb and we must recognize the fact.

Now the reason for this condition is perfectly plain. In the first place, it is in fact a reaction. The generations of men have had time to shift once on the face of the earth. Men are lovers of ease. Science is aggressive. Under the reign of science the world is forever on the *qui vive*. Men are almost afraid to open their morning papers lest during the night science may have abrogated the necessity for food, written an analysis of love, or have so far confined to wires and rods the electricity of the planet that none shall be left for thunderstorms or auroral displays. The human mind cannot be always tense. The best lecture at last puts the auditors to sleep. This will account for any popular declension. Then again, there are hundreds of educated men whose conservative sympathies are all with the older views, to whom the real significance and purport of the scientific movement are but dimly seen. Not studying science itself, but only a presentation of it—I do not say misrepresentation of it—or turning from true scientific employ to the more fascinating fields of speculation, they make of science no more than a system of philosophy, comparable to any other one of the varied schemes of human dreamings that drift hither from the hoar antiquity of the race. It is thus that Mr. A. T. Balfour in his "Foundations of Belief" and Professor Haeckel in his "Confessions" meet in their assault on the methods of science, though separated by the whole diameter of the earth in the paths of their argumentation.

May I venture to suggest that the right honorable author, not being expert in the simple phases of scientific effort, has misconceived the mission and meaning of science altogether. He says of science, "Foundations of Belief," p. 94: "Its business is to provide us with a theory of nature." Never in the world! Its business is to depict nature as we find her and to give such account as may be possible of agencies which effect her changes. Science offers no explanation of nature. The man of science may frame hypotheses, but they are only as instruments of research for his own convenience, to be used and cast away when their purpose is attained, or when better are at hand. The facts attained by science, the methods of discovering truth would remain precisely what they are, whether our theory of nature be that of the eternity of a self-created universe, whether that of the old-time theologian who literally interpreted his six creative days, or whether with the Christian child we reverently say, "In the beginning God created the heaven and the earth." With the "meaning of the world," as philosophers put it, science has nothing whatever to do; she would simply teach man such use of the world as is conducive to his own safety and well-being, such a way of looking at the world as will deliver him from fear. Surely to the "meaning of the world" to "theories of nature" the race has given sufficient attention; is it not high time we should strive to comprehend that part of the world which most directly concerns us, and which has all the while lain unnoted within our reach? But even here Mr. Balfour would discredit science. Basing an argument on what he terms "mental physiology" he impugns the evidence of the senses; he declares that science has no evidence of the existence of the world of which it tells, is based upon an illusion, exists because of an erroneous view of the natural world. The plain, every-day man of science can for once scarcely trust his eyes as he reads such pages.

Now, to any one with sufficient mental equipoise to abide by the earth, to stick to that which the whole experience of animate creation in all past ages has proven true, to any one who abides the common appreciation of fact, such a book, as far as the methods of science is concerned, appears simply as a *jeu d'esprit*, a bit of dialectic humor; but to multitudes of people who will not do this thing, who, on account of innate prejudice,

or what not, are not especially friendly to the scientific movement, such an argument will appear conclusive, demolishing in a sentence all that fifty years of science has built up. Whether such argument takes with it electric lights and cars, bacteriology, modern surgery and photography, is not so clear.

But perhaps the most curious index of the present ebb is scientific interest and enthusiasm comes from a quarter where we should least expect it, from philanthropy or altruism, as in these days we are taught to say. The eccentric Russian nobleman, Tolstoi, regarded in many quarters as the modern oracle of all efforts for social amelioration, he, too, has a grievance against science. His is the most marvellous complaint of all. I quote from the *Popular Science Monthly*, July, 1898:

“The strong, sensible laborer supposes that men who study and are supported by his labor, shall be able to tell him where to find happiness. Science should teach him how to live, how to act towards friends and relatives, and how to control instincts and desires that arise within him, how and what to believe. Instead of telling him these things, science talks about distances in the heavens, microbes, vibrations of ether and X-rays. The laborer is dissatisfied. He insists on knowing how to live. The essential thing is the total view of life, its meanings and aims. Science cannot rise to that view, religion alone can do so.”

I consider this a most remarkable utterance, but it simply shows how very far off an intelligent man may be in this year 1898 from a true appreciation of the method, the work and the mission of natural science. To declare that science has not been a blessing to earth's toiling millions can be possible only to a man who chooses to hide himself amid the serfs of benighted Russia, where aristocracy of church and state still holds millions in the superstitious degradation of medieval ages. Surely everywhere west of Russia, there is not a workman who does not by virtue of the progress of science find himself to-day better housed, better warmed, better fed, better taught in health and better nursed in sickness than ever before in the whole history of the race. The light of science converts night into day before his footsteps; for a mere pittance, a small fraction of his daily wage, he journeys to and from his work in style befitting a prince; if he be sober, his home is the abode of comfort, the best knowledge of the world is spread before his children, gifted men taught in the ways of science

are instantly at his summons everywhere to save him and his from suffering and disease. Nay, the very fact of the matter is that science made possible the continued existence of Mr. Tolstoi and his serfs, when a few years since but for science-invented steamships and telegraphs all the people of southern Russia would have perished by starvation together. Mr. Tolstoi probably appreciates this, but he fancies that the world suffers more from selfishness and tyranny than from ignorance of nature and her laws, which may be true; but the antidote for tyranny is intelligence, for selfishness wisdom, and in the winning of such virtues science is certainly a contributor not to be despised. The most democratic statesmen in Europe to-day are not the men of religion, the clericals, but the men of science. It is one function of this Academy, at least, to keep the people of Iowa from lapsing in their allegiance to what may well be called, as it seems to me, the noblest and most beneficent intellectual movement of modern times.

It would seem gratuitous thus to enter upon a defense of science or the scientific methods; they really need no defense; but after all, it is well sometimes to declare the truth. In fact science, as such, has never been popular. As usual, results only are popular. The toilsome, laborious researches recounted in the tomes of all the academies of earth are not attractive, not popular. They mean long days and nights of weary labor. Faraday and the electricians before him discovered and knew nearly all that we know to-day concerning induction and alternating currents, but Faraday never heard through a telephone the voice of his friend, nor walked in the blaze of an electric light. That came later. It is easy for men to sit by an incandescent lamp and write criticisms of the scientific method, but such men ought at least be honest enough to acknowledge their indebtedness, to own that it pays to have scientific work done, however unsatisfactory the method of the scientist may seem to them to be. How many men there are ready to ridicule meteorology, the latest effort in the field of scientific research, and yet every year, even with our present imperfect methods and knowledge, the saving to humanity by our weather service in property, health and even life itself is of moment incalculable. Besides, who shall doubt that the day is coming when the currents of the upper air may be mapped and known as exactly, perhaps, as those of the

more solid ocean, and although we may never be able to control one or the other, we may better and better adapt ourselves to their vagaries as time goes by.

In view, then, of the present need of our own people, and in view of the present status of the world of thought, it does seem to me that the necessity of our organization takes on new importance. We should, as never before, encourage each other to good work, in every way strive to foster the spread of science and its methods among the people of this good state. We are as the scientific public servants at Washington, a "university unorganized," and while we may guard as zealously as may be needed our fellowship, the council of the Academy, let us yet welcome to membership everybody in this whole state who has within him the impulse of a scientific spirit. This fair city of Des Moines surely numbers in its population scores of men in all walks of life who have our work at heart and who, if organized, might second, as nothing else could do, the efforts of this academy. It is one of the beauties of scientific investigation that the problems of science are about us everywhere. Those about the city of Des Moines are quite as interesting, fascinating, no doubt, as any others within an equal area on the face of the earth. It remains only that men open their eyes and see. A local academy of science in this, the capital city, if I may be permitted to suggest, would be a wonderful adjunct to this association and stimulate in a peculiar way an interest in science everywhere. Davenport has for many years maintained such an institution, famous throughout the world. The geologists of Iowa cannot alone maintain our work, nor can the botanists, nor the chemists, the mathematicians or astronomers, but if all unite, we can develop programs of universal interest, and thus more surely attain that prestige as an institution which would seem to be in keeping with the reputation of our state.

And let us not for a moment fear that our labor is in vain. The future of Iowa is hardly dreamed to-day by the most enthusiastic of its optimistic citizens. I look forward to the time, and that in no distant future, when the center of wealth and power in this great republic shall be within 150 miles of where we are this evening gathered. It is coming sure as the swift revolving years. The Mississippi valley is certain to be the empire of the world. When that day comes the faithful effort of this Academy will find its own reward. It will then

be seen that we, too, were foundation builders, that upon our work has risen a temple of science commensurate in usefulness, beneficence and inspiration, with the imperial destiny of our river-bordered state.

THE COLOR OF DEEP-SEA ANIMALS.

BY C. C. NUTTING.

The purpose of this paper is to explain the phenomena of bright colors among marine animals living in the sea beyond the depths to which sunlight can be supposed to penetrate to such an extent as to render bright colors visible. Although there are doubtless actinic effects of sunlight at considerable depths, we are safe, I think, in saying that colors cannot be clearly distinguished at a depth greater than 100 fathoms. Photographic experiments show that the "extreme limit of effect of the sun's rays on sensitive plates is at a depth of 250 metres," or less than 125 fathoms. As to the facts concerning coloration of deep-sea animals—and the deep sea may be considered from our standpoint as any depth below 100 fathoms—all our information leads to the conclusion that the phenomena of bright colors are present in all groups. The main sources from which I have drawn this conclusion are the "Challenger" Reports and Narrative, "The Three Cruises of the Blake," by Alexander Agassiz, and my own observations, most of which are recorded in my narrative of the "Bahama Expedition" sent out by the State University of Iowa. Professor Mosely, of the Challenger staff, says:*

"Peculiar coloring matters giving absorption spectra have now been found to exist in all the seven groups of the animal kingdom. The echinodermata and coelenterata appear to be the groups which are most prolific in such coloring matter. Pentocrinin and antedonin seem to be widely diffused in immense quantities through the tissues of the crinoids in which they occur; and the echinoderms generally seem to be characterized by the presence of evenly diffused, abundant and

*Quarterly Journal of Microscopical Science, xvii, p. 1.