

ments and the topographic features, it seemed probable that during the recession of the glacial ice-sheet a lake had been formed, which, as the ice melted out, had discharged first through the upper pass, and later through the lower one. A number of lantern slides were shown in illustration of the topographic features of the area under discussion.

GLOVER M. ALLEN,  
*Secretary.*

#### DISCUSSION AND CORRESPONDENCE.

##### THE ENDOWMENT OF RESEARCH.

TO THE EDITOR OF SCIENCE: I have been much impressed by the communication of Mr. H. H. Clayton in your recent issue, in relation to the subject of grants for scientific research, for the reason that his views coincide so closely with mine, based on both theoretical considerations and practical experience.

On two occasions I have been the recipient of such grants, and I confess that on each occasion I labored under a feeling of constant uneasiness for fear that I might not be able to accomplish what others might consider adequate returns for the amount of the grant. This feeling may have no reason for existence and perhaps it does injustice to those who have such funds in charge, but that it exists and that it has a distinct influence upon many applicants can not be questioned. It may perhaps be objected that such persons should not, or at least that they need not, seek to avail themselves of such opportunities, but this, it seems to me, would merely result in debarring many conscientious workers, while at the same time encouraging others not so sensitive.

In regard to the effect of prohibiting the payment of personal expenses out of research funds I may not be considered a competent witness, for the reason that in the two instances mentioned I was not restricted as to the manner in which the grants should be expended and it was never necessary for me to try to draw a hard and fast line between what might be considered purely personal expenses and those which were incurred solely in connection with the actual research work. Had such restrictions been imposed, however, I

believe that I should have hesitated to accept the first grant and know that I should have declined the second, on account of my inability to satisfy myself that I could draw a line so that items on either side could not be questioned or criticized.

In common, as I have reason to believe, with nearly every active scientific worker, I have always had sufficient work under way, or definitely planned, to occupy all my time for months and sometimes for years ahead, and tardiness in completing investigations has more often been due to the element of personal expenses than to any other cause. Such a condition is particularly in evidence where investigations involve the necessity of traveling. Good results can hardly be expected if the investigator is constantly harassed by having to consider whether each item of expense may be conscientiously charged to his research fund or not. The success or failure of an investigation in the field may often depend entirely upon the length of time which can be given to it, or, what is the same thing, to the sum available merely for living expenses.

In regard to laboratory work I can not speak from experience, but I do not see why any different principle should prevail in that connection than in any other. The proper basis for a grant, it seems to me, should be absolute confidence in the recipient, giving him to understand that the amount of the grant was his, to apply in any way which he might think would best accomplish, or assist in accomplishing, the object of his investigations.

ARTHUR HOLLICK.

##### SCIENTIFIC NOMENCLATURE.

A PRIME characteristic of the scientific mind is the ability to enter into details and to make distinctions, as well as to see the relation between the elements of knowledge. In order that some conception of these distinctions may be communicated to another mind, names must be given to a perpetually increasing list of objects and qualities, with divisions and subdivisions. In natural science, to try to stretch an existing vocabulary and make it cover new conceptions by using old names with new

meanings, is to invite obscurity and misunderstanding.

The unscientific mind may not always appreciate the requirements of classification as an important aid to scientific development. To one who is not a geologist nor an agriculturist, a clod of earth may be sufficiently described by a word of three letters. It is mud, and there is nothing more to be said about it. But the man who has learned to use his eyes (and one need not have a college education to do that) perceives that there may be fifty different kinds of mud; and the scientist who wishes to investigate the subject of soils and the rocks from which they are made, recognizes the necessity of an exact and elaborate nomenclature.

This need comes, in the first place, from the use of terms *as mere tools for facilitating analysis*, and thus favoring the development of a research. In this sense, that is to say, as provisory terms, invented by the investigator for the purpose of mapping out and arranging his work in an orderly way, it is desirable that the vocabulary shall be so full that it may seldom or never be necessary to use names with a double significance. Not all of these names will be retained eventually, but the looker-on must learn to tolerate them, at least during the incipient stage of path-finding investigation.

In the next place, entirely new branches of knowledge require the invention of whole classes of terms, constituting virtually a new language. To dissent from this position, and to require that the new thoughts shall be clothed in familiar forms, is as unreasonable as to require that the proposition of the maximum economy of material in the construction of the bee's cell shall be demonstrated without the use of the differential calculus, or that all psychological propositions shall be stated in terms of one sense, that of sight.

The final forms which shall be given to words expressing necessary and permanently useful distinctions of meaning are a matter which may well concern all scientific workers, whatever their specialties, as well as the general public. It is of course desirable that a new word shall be short, if this desideratum

is compatible with intelligibility. Unfortunately, most of the short-cuts which are proposed from time to time, such as sweeping reforms of an extensive and tremendously cumbersome chemical nomenclature by substituting words of one syllable, break down under a weight of meaningless memorizing which is absolutely prohibitive. Common names of plants and animals become overloaded with so many meanings in different localities as to be equally useless. The prevalent custom of inventing names by joining Greek or Latin words of cognate import, giving to the new term a special and new significance, has the advantage that the word-coinage is, to a degree, self-explanatory, at least to one who has learned a modicum of Greek and Latin words. There is no royal road to knowledge. Scientific descriptions remain unintelligible to the lazy man who hates to use the dictionary. They are free property to all who are willing to take this trouble.

FRANK W. VERY.

#### ENGINEERING NOTES.

##### INDUSTRIAL ECONOMICS.

AN interesting and probably important fact, and one which may ultimately have a serious influence upon the relative standing, industrially, of the United States and Great Britain, is reported by English papers. It is the signature of an agreement between the employers and workmen in the machine shops of Great Britain which, on the whole, would seem entirely reasonable, while in the United States the unions have refused to enter into a similarly reasonable arrangement. The initiation of the displacement of British manufacturers from their own markets and from the markets of the world was largely due to the restriction of production and the deprivation of free workmen of the privilege of working at their trades, while, in our own country, restriction of production was almost unknown and freedom of the individual was at least not absolutely destroyed. It now looks possible that the conditions may be reversed.

The British agreement provides that the unions shall not interfere with business management, nor the employers with the proper