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THE LECTURE IN COLLEGE TEACHING

By C. A. LYFORD, St. Lawrence University

It is easy to read a lecture from prepared notes. It is better to know the subject well enough so one can stand before his class and construct the presentation as he proceeds. If one is indulging in constructive thought himself, he is more likely to lead his students through the argument in a logical manner. By the expression upon one's face, and the occasional hesitation caused by the search for a proper expression, or by the motion of the hand or head which tells of a satisfactory rounding up of ideas preparatory to formulating in a sentence, the student is not only carried on by the train of thought as it unfolds, but is aided in other ways as well. He has opportunity to do a little thinking himself. He may occasionally have opportunity to anticipate. Indeed he is, without being aware of it, encouraged to anticipate; and what is anticipation under such conditions but constructive thought and invention. His inventions are quite likely to be along the proper path, and any incorrect invention is immediately corrected as the instructor proceeds. Cannot the lecture be made a presentation of a problem so that to follow the trend of thought will awaken a little of the spirit of research in the young student? Many lectures to college students are mere statements of facts and ideas so rapidly spoken that the listener can neither reconstruct the thought nor preserve the form as notes. If the lecture can be made the presentation and solution of a problem is not the student who listens virtually solving what to him is a little piece of research? Is there much more to be desired than to instill in our students a little of the spirit of inquiry? It is the belief of the writer that the lecture may, from the standpoint of the student, be the source of ideas or facts, or of both, which may take the place to some extent of actual experience to be gained only slowly in the laboratory or the world at large, and that these facts or ideas should be so arrayed before the student that he is practically bound to work out the train of thought himself, and to construct his own conclusion or theory with the feeling that he has been winning from the field of the unknown or the unassimilated something definite and objective which he can call his own. Ideally the lecture should not be used as it is so often as merely a

source for information which can be equally well gained from books. The chief object should be to vitalize the subject by giving the student opportunity and incentive to exercise his mind in company with that of the instructor. If the mind is not literally exercised the time has been largely thrown away. The writer has known a couple of young instructors whose lectures were merely repetitions of the text. The students were supposed to put a few hours a week upon the study of the text, but they soon found this unnecessary.

The lecturer should *work* before his class as an expert artist works upon his sculpture or his painting. If one wished to study sculpture from Rodin would he merely ask the artist to show him all the pieces he had ever chiselled out, or would he not more likely ask to be allowed to stand by the worker's side while he worked? The real student would attempt to anticipate the master's next move and would try to see the reason for it when the move was made. If conditions would permit, the student would certainly like to work side by side with the master upon the same piece. That man is the best lecturer who gives the greatest opportunity to his students for accompanying him in real constructive reasoning. Bagley has used the term "artistry" in connection with the thought that a teacher should teach as though what he is engaged in is the greatest achievement in life. Certainly judging from experience, it should be rated quite an achievement when a teacher can stand before a class of students and make sure that each and every one *understands* what he has been driving at. A teacher who is not conscious of great effort every time he stands before his class cannot possess the spirit of artistry and he is no better than a book.

One may recognize two sorts of lecture; one whose aim is to bring the lecturer's view before his hearers, or to recount some experience of travel or bit of observation; the other of more academic nature whose object should not be primarily to impart knowledge but to serve as an example of exposition of the *method* of attack and solution of a problem. It would follow from the argument that the lecture should not be employed for academic purposes in subjects which do not lend themselves to exposition in a constructive or evolutionary manner. It may be said that there is a kind of reciprocal relation between the ideal lecture or demonstration and the recitation. In the lecture the teacher should do most of the talking and the student should accomplish at least a minimum of constructive thought; while in the recitation the instructor subordinates himself and the student does most of the talking while his mind is actively engaged not in recalling things from memory, but in carefully working out his argument as he

proceeds. The writer frequently encounters students who lose all power of thought the instant the first word is uttered. This is because most students have in their earlier schooling come to regard a recitation as successful only if they are able to come to class anticipating every possible question and are able to go off at the pull of the trigger, stopping only when the force of the pent-up charge is spent or upon interruption by the instructor. Such students say a lot in a short time if let alone, but much of what they say is of no value; they might spend half the time thinking and half the time talking and get better results, but the thought of thought frightens them much as the feeling of water rising over one's face frightens the novice swimmer as he tries to float in the water. In such subjects as do not lend themselves to the proper lecture method, or in certain parts of other subjects, the lecture should be thrown aside and the unadulterated recitation should be used based upon text and collateral study of any sort available, whether laboratory work or further reading. During a recitation an instructor will have plenty of opportunity to make sure that no points go by improperly understood, and at such times he would be justified in giving a few moments to explanatory or descriptive discussion. Any thing that may be done to ensure that the student finally understands the subject matter at hand is legitimate, but to lecture simply because in this way it is easier to be sure that the student has been over the ground, or because it is easier for the student to sit and be amused than for him to study is not justification. If by the time a student is in college he may not be counted upon to cover the ground he is not fit to be in college. It is another matter that he may not entirely understand every little point upon his first reading, for this may be dealt with through the medium of the constructive lecture and the recitation. It is the belief of the writer that some of us are tempted to use the recitation not so much for the benefit of the student as for the purpose of getting by purely mechanical means a basis for estimating his intellectual level. This may be quite as closely approximated through mental estimate by the instructor upon daily contact with the student supplemented by occasional written tests.

To illustrate the writer's conception of the way to make use of the lecture a concrete case will be considered. In the science of chemistry the purely descriptive lecture should find very little place. If a student cannot understand a purely descriptive matter by reading he cannot do so by hearing it. Of course no lecture on such a subject can be given without the descriptive element entering to some degree. A lecture upon aluminium and its compounds which merely recounts

the facts concerning a certain set scheme of topics such as "the element and its occurrence—properties—preparation—uses—aluminium oxide and hydroxide—salts of aluminium—earthenware," etc., never appealed to the writer either as student or teacher as an especially inspiring attempt to awaken interest in the pursuit of the science. The students should study such topics from the text and in the laboratory only after a thorough introduction in the theoretical aspects based upon the place of the element in the Periodic Classification and a proper exposition of the working value of the Electromotive Series, the Dissociation Theory and the Mass Law as they pertain to the strengths of acids and bases, hydrolysis, etc. The student finds described in his text the iron sulphides and carbonate. He may not find any reference to aluminium sulphide and carbonate, and he thinks the book is incomplete and desires to find a book which describes all compounds. He has not been taught the fundamentals of the science. If he had been, he would realize that the reason why elementary books sometimes make no reference to such compounds is that under the conditions of laboratory experience those compounds are not encountered. Moreover he would know the reasons why they are not encountered, and perhaps when he takes up the study of analytical chemistry he could understand why ammonium sulphide precipitates iron sulphide and aluminium hydroxide together and not both as sulphides. A set of descriptive lectures is positive in its information so far as it goes, but it does not explain the hyatuses and omissions. In other words, the student escapes without becoming aware of the limitations of experience and procedure in scientific work. The term "descriptive chemistry" might be dropped from the college curriculum and some better one substituted. Perhaps a different title for the course, one with a little more suggestion of the dynamic, might cause an unconscious effect upon the instructor which would gradually lift him out of the rut of simple description, and give him some incentive to work his own mind a little. Example has a certain pedagogic value even with college students, and a dissipating imitation is always more easily excited than creative imitation is.

Though the question of the relative pedagogic values of a purely lecture course introduction to a science like chemistry and a mixed laboratory—recitation introduction is not germane to the original thought that prompted the writing of this paper, the writer cannot forego making a few remarks concerning beginning the subject of chemistry by the purely lecture method. In academic circles one soon becomes aware of the existence of two armed camps. One of these usually appears

to be a little more on the defensive than the other. One is a little afraid of the other, and the other doesn't care enough for the booty to make an assault on the first, for it believes it sees things going favorably for its interests. I refer of course to the classical camp and the scientist camp. Many well educated people have studied Latin, History, Philosophy, Ethics and Theology, and perhaps have had some "lecture courses in science." Such people took the lecture courses in science in just the same way they did their letters courses. The exercise of the memory is the chief aid in gaining such an education. How many are the men whose education is based almost entirely upon the things of the past or the empty speculations of the future. How many are the ministers whose sole preparation in any subject calculated to teach methods and practice of physical precision was gained by the same method that imparted to them their training in Hebrew and theology. Many ministers have become college presidents. Believed to be leaders in the educational world, they are more often hustlers for money. It is difficult to believe that one whose education has been gained almost entirely without exercise of the physiological senses of perception can possess the power of apperception to a degree sufficient to sympathize with the recent trend in education as it is being worked out by pedagogues of laboratory training in daily contact with students. The champion of the Classics must claim either that an education may be satisfactorily obtained without the coordinating development of the primary senses, or else that the study of the Classics does train all the perceptive senses equally well as the laboratory studies do. The scientist has the feeling that a real education, one which equips the student to meet the new problems of the future, can be obtained only through training of the perceptive senses, in observation, in construction, in formulation of ideas, and finally in lucid statement of the thoughts which have actually been engendered as the result of his experience. Elementary laboratory exercises are the experiences of the young beginner. If we take them away do we not lower the educational ideal of the scientist to the memory level as typified in classical study? Without attempting to cast a deciding vote in favor of either camp it may be said, however, that it is a shame for a scientist to think he is teaching science to beginning students when he gives a semester's time to a course of lectures in "Descriptive Chemistry," especially if no laboratory experience be given. It is a shame if for no other reason than that he is throwing away the only distinct advantage over the Classics claimed for science studies in the educational equipment of the student.

The thoughts expressed above represent an ideal concern-

ing the lecture method toward which the writer has always looked. He has never attained that ideal, but has more nearly approached it when working with adequate facilities than when shifting along without them. In many institutions there are three men doing the work that two might do if provided with proper material facilities and conveniences. Trustees and presidents sometimes appear to think it better economy to wear out their teachers and get poor results than to spend a little more on equipment and produce the conditions for a much more satisfactory academic atmosphere. Doubtless it is in some cases lack of proper equipment that tempts the college teacher of science to overdo the lecture method of instruction and indulge in pure book description into the bargain.