REPORT OF THE COMMITTEE ON CO-OPERATION¹By C. E. PEET, *Lewis Institute*, and W. S. MCGEE,*Hyde Park High School, Chicago.*

In its report your committee has interpreted the resolutions of last year in a broad way and has sought to canvass the field to ascertain what benefits may be obtained through coöperation in gathering materials which will aid in the teaching of the earth sciences. The report makes no pretense to be exhaustive but the intention is simply to open up the field and leave to the future its full cultivation.

The lines of profitable co-operation may be grouped into three main groups:

I. The collection and exchange of informational, illustrative, and museum material.

II. Co-operation in securing legislation.

III. Co-operation in securing positions appropriate to the needs of the instructor.

I. *Collection and exchange of informational, illustrative and museum materials.* There are already great organizations spending hundreds of thousands of dollars (in the aggregate) annually, in gathering and disseminating information that we need. Some of these organizations like the United States Geological Survey publish bibliographies of the literature of the subject, so that there is a way to find the information contained in these publications.

(1). We need a bibliography of bibliographies.

(2). We need also to extend the bibliographies to special subjects so that they will cover the literature adapted to the student as well as that adapted to the teacher. Such bibliographies should include magazine articles as well as books of travel, and scientific publications and should indicate the age of the student for which the literature is appropriate. If all the bibliographies were known and if they covered the field perfectly the fact would still remain that much of the material wanted is unobtainable and much of the material that is obtainable is in unavailable shape.

From the vast reservoir of information within the United States Government and State survey reports we could be supplied with much material we need in our teaching of geology, physiography and geography. This vast amount of material should be drawn upon and put into shape adapted for the use of the student.² It should then be published so that it will be within the reach of all. In an ideal co-operative organization the cost of such material should be the mere cost of paper and printing. We are confident that should a movement be set on foot to put this information into a form adapted to the needs of the young it would receive the hearty co-operation of not only the State Geologists but the heads of the great Government bureaus and

¹ Read before the Earth Science Section of the Central Association of Science and Mathematics Teachers, December 1905.

² Two books have recently appeared (1907) which make a step in this direction. They are Condra's *Geography of Nebraska* and the *Geology and Physical Geography of Wisconsin* by E. C. Case.

other great institutions serving the public just as we are trying to serve it. We venture to say that there would be no difficulty in obtaining illustrations both from these institutions and from the railroads and other transportation companies. The possibilities of this means of supplying illustrative material at a very small cost do not begin to be appreciated.

(3). Were all this done, gaps would still be found that need to be filled. In the study of various parts of the world through the topographic maps, detailed information which is not now available is frequently needed to understand the cause of the location and growth of villages and cities, peculiar forms of boundary lines, the historical significance of the names, and numerous other things. This information should be available so that the student can look up these things and satisfy himself that there are reasons for them. The information first supplied should be for those regions covered by the topographic maps commonly studied. Along with this literature should go pictures so described that the student would understand just what part of the region on the map the photograph represents. Such illustrations would greatly aid the student in picturing the features of the region.

There are county histories from which some of the information desired could be extracted by those competent to judge of its value. By co-operation with the history teachers' associations such information should soon become available. Every teacher of the earth sciences or of history should be a source of definite information for his own locality as to the history of settlements and the growth of the cities and the causes therefor.

This work should finally result in the publication of monographs on the different physiographic districts and their natural subdivisions, covering the topography and its history, the life of the district including the aboriginal inhabitants and their adaptations to environment, accounts of early explorations with their relations to the topography, accounts of the early settlements, the origin and significance of the names of places, the causes for the location of villages and cities including the successive factors in their growth and the changes in village sites and the causes, and finally the present industries and occupations of the people. Such a monograph as is planned by the Geographic Society of Chicago on Chicago might well be planned for every city of fair size and for groups of cities of smaller size.

(4). While satisfying the demands for information in geology, physiography and geography is important, of still greater importance is the gathering of information bearing on the educational problems connected with the teaching of these subjects. A system of coöperation should result in the appointment of a special committee to gather information as to the needs of the student at each of the stages in which he is under our care.³ This investigation should seek to discover what are the interests of the student, what things appeal to him most, what things produce in him the greatest growth in the right direction, what his demands at each stage are, and the best means of creating in him

³ Such a committee was appointed at the Chicago meeting, December, 1906.

at each stage the right demands. This committee might well raise the question whether the physiography as now taught (usually in the place in the curriculum appropriate for a general introduction to science), is broad enough to meet the needs of the young student; whether it would not be better to make it frankly a general introduction to science, which shall have its roots in those portions of physics, chemistry and astronomy which appeal to the young student, the portions full of demonstrations and laboratory exercises of the kind which delight the student's heart, arouse his enthusiasm, and increase his desire for more and deeper knowledge. Is this not indeed the time to open the door and let the student look in at the good things that are ahead and to start him happily on the way to acquiring the methods of science? The subject matter could not well stop with the roots of this tree of knowledge, as it were. We already have the trunk in the physiography as now taught generally. Should not the branches and foliage be permitted to grow in the form of geography so taught as to bring out the relations between the physical features of the earth and the life upon it and especially the human life of the present, with its manifold activities and institutions and the stages of growth of these institutions and activities? Such a committee might well get together for supplementary reading a list of books of travel, early exploration and adventure, which would stimulate in the student a desire to travel, create in him a thirst for greater geographic knowledge, widen his horizon and deepen his interest by giving him that background of knowledge which makes physiography interesting to us.⁴ Such a selection of books should be made through the students themselves so that it would include the books actually of interest to them, not those in which we think they should be interested. This work might well include the preparation of maps to accompany such books as are not properly supplied with them, and also the preparation of sets of questions that would call the attention of the student to important points in such a way that in answering the questions he will get the profitable points bearing on the geography and physiography. This work might go so far as either to arrange for, or actually include, the production of suitable literature to fill the gaps which now remain unfilled. Such a committee would no doubt receive the cordial co-operation of the public libraries in compiling the lists here suggested. Similar efforts on the part of teachers of other departments have received encouragement and financial aid in publishing the lists. There is danger indeed that the secondary schools will fall behind the grammar schools in this enterprise.

(5). A subcommittee might well devise a system of correspondence similar to that in force among the students of foreign languages by which not only students but instructors would be able to get into communication with all parts of the world and thus gain desired information from those on the ground. That there are difficulties to be over-

⁴ Such a list of books was prepared in 1906 and mimeographed copies are now in the hands of volunteers who are testing the books by placing them in the hands of the student and watching the result. It is proposed to print the list when the test is completed and a final selection has been made. The list should be extended to magazine articles answering the same purpose.

come one can readily see, and to those who find it difficult to keep up with their present correspondence these will stand out prominently. Nevertheless, it would seem as though it would be worth while trying. If instructors and students do not take to it, then it should go the way all things go for which there is no demand or for which no demand can be created.

(6 and 7). Collection and exchange of museum and other illustrative materials. We have finally arrived at the topic which no doubt was chiefly in mind last year when the motion was made for the appointment of the committee—the exchange of illustrative materials. Theoretically it seems a nice scheme. It seems as if instructors in the earth sciences, widely scattered, could arrange a scheme of coöperation in the exchange of rocks, minerals, soils, and of museum materials of various kinds arranged in series showing the stages from the original raw material to the manufactured product. It would seem that grains, such as rice, corn, wheat, oats; fibers, such as cotton, wool, flax, hemp; minerals, such as iron, copper, nickel, lead, graphite, and other material, such as rubber, paper, sugar, naval stores, and many other things might be gathered in this way and exchanged. With these should go photographs showing the various stages in the progress of the raw materials to the finished products. Many of the things mentioned are heavy, and a systematic exchange of such materials would necessitate establishing a convenient center to which the materials could be shipped and made up into the proper form. When a sufficient collection had been gathered together different sets could be shipped to each individual coöperating. It would seem as if the entire time of one man might be taken up with gathering, arranging and shipping such materials.

It would seem that those who have constructed models could easily make copies from the moulds and that they might be exchanged direct. Your committee hoped to receive replies from several who we know have made models. We thought that they would be willing to make copies for exchange but we have been disappointed. No doubt, however, with the movement once started, there would be greater freedom in offering, and probably more models would be made were it known that they could be exchanged for others. The present high price of models is a good reason for such a coöperative scheme of exchange.

Almost everybody, whether working in geography or not, has a camera. With the thousands of cameras working in various parts of the world, it would be surprising if exchange of pictures could not supply to all of us those which we need. It ought to be possible to satisfy specific wants through correspondence with individuals, or perhaps better still through communication with some central body in touch with all. Your committee has endeavored through correspondence and through conversation to learn what are the unsatisfied demands of the teachers of the earth sciences and what each one can contribute toward a common or individual need. The returns are enough to convince us that there will be no spontaneous and immediate general participation in a movement to supply materials. If this is to be successful there must be selected out ten or a dozen or fifty people to do

the work in each country. It is plain that where people are as busy as we are, anything which lies outside of our immediate duties as teachers is likely to be neglected. This gathering of material does lie outside of these duties. The gathering of information lies right alongside of our immediate duties. The study of the *interests and needs of the student is an immediate duty*.⁵

II. *Législation*. In these days of agitation for railroad rate legislation it may not be shocking to propose rate legislation which shall favor the field excursion for educational purposes. It may be hoping for the impossible, but is it not true that transportation for educational purposes should be put on a different basis from transportation for business purposes, and is it not possible that concessions may be wrung by legislation from the railroad officials who resist like adamant the appeals from educators for rates as low as those granted to theatrical troupes?

III. *Coöperation as to positions*. It is looking far into the future, perhaps, and is but putting a dream into words to speak of a system of international migration of instructors in geography, so arranged that in the course of ten years or so one could have resided in several different countries and climates and arrive at the original starting point with a rich store of knowledge and the power of arousing enthusiasm in the student of geography such as can be aroused by one who has had adventures in strange lands. We are hearing nowadays of the exchange of instructors between the great universities of America and Europe. The dream for secondary schools is but a step farther. If such things could creep down from the colleges and universities as rapidly as have football, fraternities, college yells, and college rowdiness, it certainly would not take long for an international exchange of instructors to descend to the secondary schools.

⁵It is more than a duty. It is a *privilege*. It offers that opportunity for *investigation* so much desired by many secondary school instructors and so often urged by the University Professor. The investigator's attitude of mind in the teacher changes the whole aspect of school room problems. It may even make the reading of papers a pleasure. Mistakes, before a vexation, now are items of interest because they show how the student's mind is working. It gives the teacher an appreciation of the personality of the individual student that is a pleasure and a never-ending source of interest, and results in bringing student and teacher nearer together, for there is nothing to which the student is so sensitive as to the real feeling of the instructor toward him. The instructor is thus placed in a position of advantage in discovering the hopes and ambitions that lie deeply concealed in the heart of the student. When these things are known the problem of satisfying the demand of the student or of stimulating in him demands that will result in his greatest growth may be attacked by the methods which the scientist is accustomed to use in the solution of his problems. Is it not a reflection on the scientific methods of the science teacher that so much time has been given to studying how to teach the subject and so little time has been given to studying what the nature of the student demands at the successive stages of his growth?