

This article was downloaded by: [UQ Library]

On: 31 October 2014, At: 21:29

Publisher: Routledge

Informa Ltd Registered in England and Wales Registered Number: 1072954

Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



Journal of Geography

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/rjog20>

Map Drawing in the Schools, II

Douglas Wilson Johnson^a

^a Harvard University

Published online: 09 May 2008.

To cite this article: Douglas Wilson Johnson (1910) Map Drawing in the Schools, II, Journal of Geography, 8:8, 169-178, DOI: [10.1080/00221341008985444](https://doi.org/10.1080/00221341008985444)

To link to this article: <http://dx.doi.org/10.1080/00221341008985444>

PLEASE SCROLL DOWN FOR ARTICLE

Taylor & Francis makes every effort to ensure the accuracy of all the information (the "Content") contained in the publications on our platform. However, Taylor & Francis, our agents, and our licensors make no representations or warranties whatsoever as to the accuracy, completeness, or suitability for any purpose of the Content. Any opinions and views expressed in this publication are the opinions and views of the authors, and are not the views of or endorsed by Taylor & Francis. The accuracy of the Content should not be relied upon and should be independently verified with primary sources of information. Taylor and Francis shall not be liable for any losses, actions, claims, proceedings, demands, costs, expenses, damages, and other liabilities whatsoever or howsoever caused arising directly or indirectly in connection with, in relation to or arising out of the use of the Content.

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is

expressly forbidden. Terms & Conditions of access and use can be found at
<http://www.tandfonline.com/page/terms-and-conditions>

THE JOURNAL OF GEOGRAPHY

Vol. VIII

APRIL, 1910

No. 8

MAP DRAWING IN THE SCHOOLS, II

By Douglas Wilson Johnson
Harvard University

IN some schools map drawing does not form any part of the work in geography. Under these circumstances it is easy to understand why the pupils acquire no adequate mental picture of the earth's surface features, for experience proves most conclusively that such a picture is not acquired as the result of observing maps alone. The pupil sees maps of different scales, on different projections and hence differently distorted, and much of the time single continents or parts of continents out of association with neighboring areas, until his memory retains only a hazy and confused impression which is sufficient to enable him to recognize instantly any map which is placed before him, but which is not sufficient to enable him to draw a respectable map of his own. Why map drawing should be left out of some schools entirely, is in itself an interesting question. Perhaps some teachers are not convinced of the value of a good memory map of the world, never having had one of their own. The man who never learned his multiplication tables may not appreciate his loss very fully. It seems to me that a memory map may properly be compared with the multiplication tables, for both are things every person should have thoroughly in mind, in order to appreciate many other things. Each is a fundamental element in its respective science, and should be faithfully taught and fully mastered, not merely for the sake of the mental discipline thereby gained, but more especially that the student may be equipped with a valuable tool which will be of incalculable service as long as he lives.

Map drawing has been omitted from other schools for a somewhat better reason. The supervisor in geography in one school told me that she fully appreciated the desirability of equipping the students with good memory maps, but that she had found the results of previous work to that end most unsatisfactory, and

had about decided it would be better to devote the time to something more profitable. I imagine a good many teachers must have come to the same conclusion, and it would be surprising indeed if they had not. The trouble is not that the teachers themselves have been remiss, but rather that the subject of map drawing, often regarded as so insignificant and simple a part of geography as to demand no special study, is really a subject beset with practical difficulties, and requiring scientific treatment. The truth of this statement I shall endeavor to demonstrate a little later.

Where map drawing is taught in the schools, the failure to reach what we have decided is no more than a reasonably high standard may be due to the insufficient amount of time given to the subject, or to the use of unsatisfactory methods. When the former is the case, we can look for improvement just as soon as the teacher becomes convinced of the high value of a good memory map. But I am inclined to believe that the greater source of difficulty lies in the methods employed to teach map drawing.

Just here it becomes necessary for us to pause long enough to examine into the nature of map drawing, to the end that we may fully appreciate the kind of problem which confronts us. With the problem clearly in mind, we may more intelligently examine the methods employed in dealing with it.

It has been too often assumed that the drawing of map outlines is similar to the drawing of outlines of some blackboard figure, or of some object provided for the drawing lesson. There is a vital difference, however, and one which is of considerable significance to the student of map-drawing methods. The map from which the pupil draws is itself a much distorted representation of the real thing, since no map represents both area and directions correctly. This would not be so bad, if all other representations of the same thing were similarly distorted. But they are not. The pupil is assigned the task of drawing a certain map printed in his text-book, and perhaps is asked to study the outlines until he can draw the map from memory. He tries to memorize the outlines, but during this process he sees the map not alone in his book, but perhaps on the big wall map hanging before him, and on the globe on the teacher's desk. No two of these representations of the area being studied are alike as to size or shape. Perhaps the teacher furnishes him with some printed outline maps for a part of the geography work, or the pupil consults an atlas

at school or at home. Altogether he encounters at one time or another a variety of maps of the same area, differing greatly from each other in size due to differences in scale, as well as in shape due to differences in the projections on which they are based. Is it any wonder that the pupil who understands nothing of map projection and map distortion gains a vague mental picture of continental outline? And if he is required to draw one continent at a time, from different maps, must not his conceptions of continental position remain more or less vague?

In all the variously shaped maps representing a given area, there is one constant factor: the relation of each and every part of the outline to the meridians of longitude and parallels of latitude does not change. Thus the *relative* position of every point in the outline and of every continent as a whole remains the same, no matter how much the general shape of the areas may vary on different projections. In the ordinary drawing which school pupils are called upon to do, the general shape, if not the size of the model, is a constant factor. In map drawing both shape and size vary, and a certain *relation* is the constant factor. Any system of map drawing which does not recognize this fundamentally important fact is foreordained to failure. It is no use trying to limit the pupil to one type of map, placing all emphasis on the shape of that one type. Other types are too common to make this possible, and too much used to make it desirable. We must recognize the scientific basis of map drawing, and teach the subject in a scientific manner.

One very common method of teaching map drawing, already incidentally referred to above, is to have the pupil copy the outlines of some printed map. The Equator and Tropics or Polar Circles may be drawn; but as a rule little attention to latitude, and no attention to longitude, is required. Frequently the student practices drawing one continent at a time, and the drawings are based on different maps widely separated from each other in the text-book, and perhaps of different scales. Thus he gains no proper conception of relative size or relative position on the globe of the areas mapped. Perhaps the student is supposed to gain these conceptions by referring to a globe or a world map; but that he does so only in the crudest way is readily shown by asking him to combine his several drawings in a memory map of the world. The fundamental difficulty with this method is that it

ignores the one constant factor which should form the basis of all map drawing—the relation of continental outlines to latitude and longitude. Were the several isolated maps studied from this standpoint, they could readily be combined into a world map on any projection, with relative sizes, shapes, and positions all correct. Let us note one more difficulty which hampers this method of map drawing. It is difficult for the teacher properly to correct all errors in the memory map based on this method. Every teacher who has corrected memory map drawings knows how easy it is to tell that certain maps are not well proportioned, yet how difficult to point out quickly the precise trouble. In the absence of meridians and parallels, and with the complication of having maps of different sizes drawn by different students, it requires unusual patience and skill on the part of the teacher to seek out the errors of each map and correct them properly. Often the overworked teacher finds it impossible to do this, and the pupil loses the benefit which he would derive from such corrections. Were these same maps drawn by the pupils on some standard scheme of meridians and parallels, they should all be of the same size as well as shape; and corrections could be rapidly and accurately made by superposing each pupil's map upon a correct specimen copy kept by the teacher for the purpose.

Another method of map drawing consists in tracing with pen or pencil very dim outline maps. The outline maps are printed in some pale ink, and the pupil's task is to follow the outline carefully with his pencil, intensifying the lines until the map stands out with greater distinctness. This requires the pupil to follow every irregularity of coastline, rivers, etc., and is doubtless better than no map drawing. The strongest objection to the method is that it is wholly mechanical and involves no mental effort on the part of the pupil. Even if the pupil endeavors to fix the outline in his memory as he draws, the method does not reveal to him the places where his memory is treacherous, and does not make an impression sufficiently strong to rectify defects of memory of which he is not distinctly conscious. The attention of the student is not directed to the relative size or relative position of the continent he is drawing, nor even to the shape of its outline, except in a mechanical way. What little knowledge of continental shape "soaks" into the mind of the pupil is a poor return for the time expended, and the method has little to commend it to the

teacher who is anxious to have his pupils equipped with good mental pictures of the earth's broader features.

Still another method is based on the construction of geometrical figures as guides for the drawing of continental outlines. For the more irregular continents the figures are often quite complex, and it requires several times as long to construct the geometrical figures given in some text-books as it does to draw the continental outlines themselves. The figures are wholly artificial and arbitrary, and their construction must be memorized if they are to serve as the basis of memory maps. In using them the student gains no knowledge of the relative positions of the continents, and often no idea of their relative sizes. It is impossible to learn a new construction for every different projection of a given continent, so some one type of projection is arbitrarily chosen; and the student's mind, propped by the artificial diagram, acquires more or less of an idea of the outlines of the continent as shown on one projection only. Why any one should invent so delusive an aid to map drawing, when there is a geometrical basis of scientific value already available, it is difficult to conceive. Intersecting meridians and parallels, in relation to which the outlines of continents never vary, afford geometrical figures which enable the properly trained student to draw memory maps on any type of projection, whether he has ever seen such a projection before or not. Fortunately, the method of drawing maps on arbitrary geometrical figures has been much discredited in recent years, for it not only takes valuable time but also does the student harm rather than good. We cannot but approve the condemnation of this method which Redway has voiced in his *New Basis of Geography*, p. 162.

"There are still a few teachers of geography who go through the laborious process of working out 'construction' diagrams that are to be memorized by the pupils. Just what is gained by such a plan is not clear. A construction diagram that would apply to a given area in one book could scarcely be used in the maps of another. If it is intended as an aid in producing an elaborately finished map, such a clumsy device is useless; it is also a confession of ignorance of the fundamental principles of map drawing. If a finished map is required, the parallels and meridians must appear, or the map has no value."

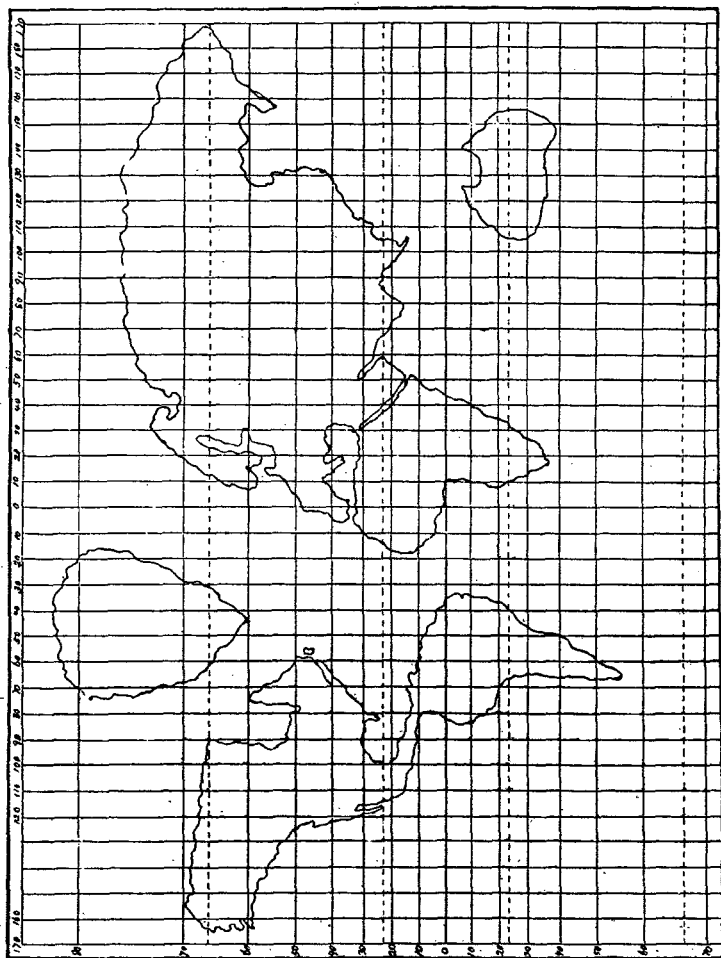


Fig. 3. Mercator map of world drawn from memory by 12 year old pupil, on printed projection.
Time 10 minutes.

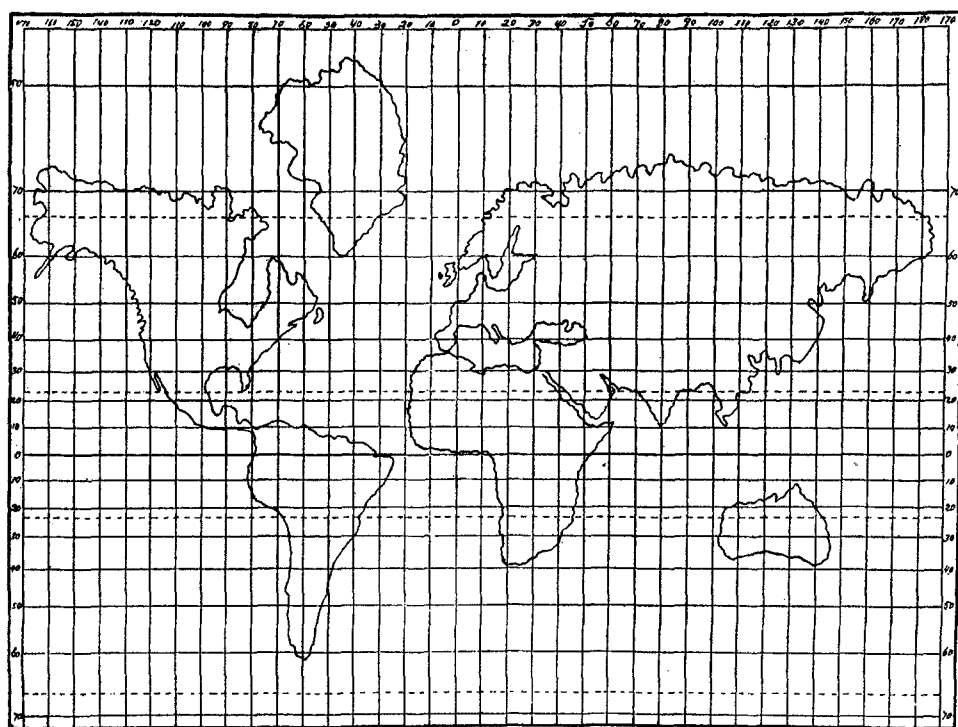


FIG. 4 Mercator map of world drawn from 'memory, by 13 year old pupil, on printed projection.
Time 15 minutes.

A method of instruction in map drawing which has far more to commend it is in use by some of our geography teachers, and has been somewhat fully described of late in a series of articles in the *Popular Educator*, written by a superintendent in one of our southern cities.* In this method the pupil is required to construct a projection of meridians and parallels. This the pupil may learn to do from memory. Having also memorized the latitudes and longitudes of a certain number of places, he locates these places by dots on his "homemade" projection. With the dots as guiding points, he then sketches in the outlines of the continents from memory. Let us note for a moment the great advantage of this method. In the first place, the principle is fundamentally correct, for the pupil memorizes the one constant factor in map drawing—the relation of continental outlines to the meridians and parallels. If another projection is substituted for the one he has learned to draw, he can at once locate the places whose latitudes and longitudes he knows, and with these guides draw a map different in shape from the first one, but equally correct. The method enables the student to appreciate how explorers map new land by determining the latitudes and longitudes of various points and sketching in the physical features. Whether the student draws one or several continents, each one is always properly placed in relation to the other continents, and is of its proper relative size. But certain practical difficulties confront the teacher who would adopt this method. The construction of any projection requires considerable time. In order to attain proficiency in map drawing a pupil must have practice in drawing continental outlines repeatedly. But this is out of the question when a long and possibly difficult construction must be made every time a practice map is drawn. The student is pretty sure to lose the benefit of much practice, unless far more time be given to this subject than it rightly deserves. Furthermore, he is pretty sure to become familiar with but one type of projection, for it would require too much time to teach him how to construct several projections and to have him use each of them as a basis for map drawing.

It would seem that the practical difficulties just mentioned might be overcome; and the last method of map drawing of which I shall speak is really a modification of the one just

*E. L. Hughes in *Popular Educator* for March, April, May and June, 1908.

described, offering fewer difficulties and certain additional advantages. In this method advantage is taken of printed projections of meridians and parallels which, however, have no outlines of continents shown on them. Several types of printed projections are used, such as the mercator, orthographic, globular, and conic. If desired, the pupil may be taught how to construct these projections for himself; but having once learned the technique of construction, he is furnished with printed projections on which he may draw as many practice maps as he wishes. Taking a printed projection of any type, he first numbers the meridians and parallels, then locates the points whose latitude and longitude he has memorized, and finally draws in the continental outlines guided by these points. Having memorized the guide points and outlines for one projection, he can draw maps on any other projection without additional study. In so doing, he comes to have a full appreciation of the distortion of maps, and learns to recognize at a glance the character and amount of distortion peculiar to several of the more common projections. The limitations and uses of maps may now be explained to him with some assurances that he will prove an intelligent listener. The meaning of north and south latitude, east and west longitude, are automatically learned, and the uses we make of latitude and longitude determinations can be made clear to him on the basis of his experience. Having cheap printed projections to replace those constructed at the expense of much time and labor, the pupil can practice until he acquires a proficiency in map drawing never attained by other methods. Experience shows that instead of a hazy mental conception of continental outlines based on a confusion of several kinds of maps of the same area, even young pupils get a clear mental picture of the relation of outlines to meridians and parallels, and are able to reproduce quickly maps of considerable accuracy on different types of projections.

Just a word as to the practicability of this method. I have sometimes been asked, "Does it not take too much time to learn the latitudes and longitudes of places? Can grade pupils make effective use of them if they do learn them? And even if they do learn to draw good maps on this basis, will they not forget all they have learned in a short time?" As to the memorizing of location points, it may be said that the pupils find this an easier task than might be supposed. And even were the task

really difficult, the time expended would be fully justified by the truly remarkable results obtained. An excessive number of location points should not be required. Three is enough for South America, five or six enough for North America. That the grade pupils can do the work effectively is shown by Figures 3 to 5. As to how long the pupil's memory will retain what he has learned, my own experience covers too short a period to furnish a wholly satisfactory answer. I have tested college students after a lapse of from several months to more than a

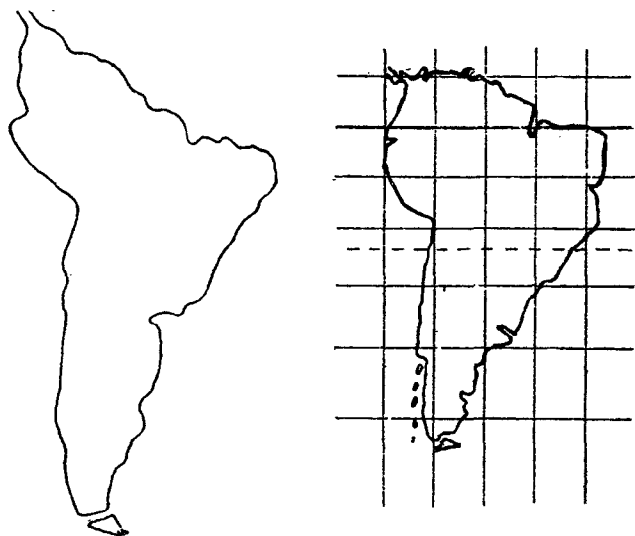


FIG. 5. Two maps of South America copied from blackboard map by seventh grade pupil, without and with aid of meridians and parallels. The second map required the shorter time.

year since they had practiced map drawing, and have found that they could still draw remarkably good maps. The only test of this kind which I have applied to grade pupils was the drawing of North America by seventh grade pupils six months after they had completed a very brief practice in drawing that continent. The results were most gratifying. There is no doubt in my own mind that pupils trained to draw maps by the latitude and longitude method, if we may so designate the last of the methods considered above, will carry with them mental maps which are more accurate and more lasting than can be secured by any other method.