COMMUNICATIONS

Structure of the Disciplines and History

The purpose of this paper is to examine the phrase "structure of the disciplines," a phrase currently in vogue in educational circles. My intent is to explore the meaning or meanings of structure, with specific attention to the ramifications for history. I hope to lend some insight into answering the following questions. To what are we referring as structure of a discipline? Must every discipline have a structure? What is the educational value of structure? Lastly, what is the structure of history?

"Structure of the disciplines," as used today, is probably not much more than ten years old. Bruner used the phrase in *The Process of Education,* a thin book which reported on and summarized the proceedings of a 1959 conference held at Woods Hole, Massachusetts. The purpose of the conference was to bring together scholars, scientists, and educators in order to see how science and education might be improved in the secondary and elementary schools. "Structure of the disciplines" may not have been born at that conference, but one can trace its present meaning and popularity to there. The earliest article on "structure of the disciplines" which I could find was dated 1962. Neither the *Dictionary of Education* (published 1945) nor the *Encyclopedia of Educational Research* (published 1960) carry the term. Prior to volume 15 (1964-65) "structure of the disciplines" was not listed in the *Education Index,* but it has been listed in succeeding volumes. The apparent digression in tracing the origin of "structure" has a purpose, for an underlying assumption of this paper is that structure owes its present educational meaning to Bruner: if he did not coin the term then at least to his popularization of it through *The Process of Education.* A further assumption is that structure as developed in *The Process of Education* has more than one meaning, but that since its inception, structure has been bandied about as if its meanings were interchangeable.

In *The Language of Education* Scheffler differentiates between general definitions used in educational discourse and scientific definitions. "General" is opposed to scientific, the argument being that terms used by scientists in explaining their work have more precision and currency of meaning than do non-scientific terms. Scheffler breaks down general definitions into several types, according to usage. A *stipulative* definition is a term used in a special way for a definite period of time. It is a term whose meaning need not be congruent with previously accepted usage. In this respect a stipulative definition can be quite arbitrary.

Its principal usefulness is in providing a convenient meaning, perhaps of an abbreviatory nature, within a definite context. Stipulative definitions come in two kinds, depending on whether the definition refers to a term with a prior use. Where it does, the stipulative is called non-inventive. When the term has had no previous usage, Scheffler would label it an inventive stipulative.

A second category of general definitions is called *descriptive.* A descriptive definition undertakes to give a further account of meaning. Whereas the stipulative gives a new meaning, perhaps condensed and often theoretically eliminable, the descriptive definition expands an older definition. The descriptive definition can have none of the arbitrary quality often possessed by stipulative definitions, for the descriptive must reflect normal usage.

The third category of general definitions argues the case for a course of action or a program, and is called *programmatic.* A programmatic definition, by investing a term with meaning, urges the accomplishment of one thing rather than another. In "all men are created equal" how one defined any of several terms would have the effect of arguing a program of action. Programmatic definitions, as is also true of descriptive and stipulative, are not recognizable solely by their linguistic form but must be considered relative to context.

> We may now sum up the comparison of our three sorts of general definitions by labelling, in a rough way, the interest underlying each sort. The interest of stipulative definitions is communicatory, that is to say, they are offered in the hope of facilitating discourse; the interest of descriptive definitions is explanatory, that is, they purport to clarify the normal application of terms; the interest of programmatic definitions is moral, that is, they are intended to embody programs of action.[1]

How did Bruner define structure, and into which of the above categories would his definition fall? According to Bruner "Grasping the struture of a subject is understanding it in a way that permits many other things to be related to it meaningfully. To learn structure, in short, is to learn how things are related."[2] Since structure had a prior use it was not an inventive stipulative. Since Bruner made no effort to expand the meaning of structure beyond its usual dictionary meaning, it wasn't a descriptive definition. It is evident that Bruner was using structure as a non-inventive stipulative, a programmatic definition, or, as I believe, both.

It would appear obvious that Bruner, instead of going into an extended explanation every time he meant the conceptualizing principles around which the subject matter of a discipline is organized (we will agree that this is a mouthful), used the word structure. It had a prior meaning, a meaning self-evident to all. Who did not know the meaning of the word structure, while from there it was but a short step to structure

[1]Israel Scheffler, *The Language of Education* (Springfield, Illinois: Charles C. Thomas, 1960), p. 22.

[2]Jerome Bruner, *The Process of Education* (Cambridge: Harvard University Press, 1960), p. 7.

of the disciplines. In this sense Bruner used structure as a non-inventive stipulative, but, as Scheffler points out,[3] the same term may be stipulative, descriptive, or programmatic, depending on the context in which it is used. When Bruner argues that a discipline's structure be taught, as *The Process of Education* does at length, then structure acquires a meaning in which a course of action is advocated and structure becomes a programmatic definition. As such, Bruner advocates teaching a discipline's structure in order to facilitate the transfer of learning from one area to another. Teaching the structure, the conceptualizing and organizational principles of a discipline, will facilitate teaching and learning and will make knowledge more usable and understandable.

It seems that the origin of any unclearness about the role of structure occurs when one moves from using structure as a stipulative to structure as a programmatic definition. As a stipulative term structure is an agreeable shorthand for saying that knowledge is classifiable; that knowledge can be categorized into what has been called disciplines, and the framework of a discipline is its structure. But as a programmatic word structure argues for itself being taught as if, as a matter of course, every discipline had a structure which could be taught and which by being taught facilitates teaching and learning. The argument is not whether or not a discipline has a structure, because in one sense every discipline must have one, but whether every discipline has an *apprehendable* structure, one which is definitely teachable. We may agree with Bruner's use of structure as a stipulative definition. It is convenient, condensing many words into one. We will all probably agree with the intent of his programmatic definition. Who wouldn't teach the significant rather than the unimportant, the useful rather than the useless, that which can be related and serves multiple purposes rather than the singularly specific? We can agree on all counts, but our agreement does not make the concept of a teachable structure a reality. " . . . The jump from definition to action is long and hazardous, even where the definition is unquestionably accurate as an account of meaning."[4]

On the surface the answer to the question of whether every discipline must have a structure is self-evident. If a discipline is to be a discipline and not something else, if it is to be a body of defined knowledge and not mere congeries of unrelated facts, then that which makes it a discipline must be a structuring principle. Consequently every discipline has a structure of some sort, but are all disciplines equally structured, or, like being equal in *Animal Farm,* are some more structured than others? The most partisan defenders of the humanities are hard pressed not to agree that their studies are less structured than the more scientific ones. Although there is no agreement among scholars as to the least structured, there is a consensus that mathematics is the most structured of the disciplines. If we want to, we can picture a hierarchy

[3]Scheffler, *op. cit.,* p. 20.
[4]*Ibid.,* p. 30.

of disciplines — a hierarchy in structure, not importance — going from the most structured to the lesser structured. Given these differences in amount of structure between disciplines, the question becomes: at what point on a continuum of structure is a study not a discipline. In other words, by moving on a continuum away from mathematics when will a discipline cease to be a discipline?

The argument leads inevitably to defining a discipline, and this becomes a semantic battlefield peopled by scholastics at their worst (departmental empire builders and defenders of their slice of academe). There is also a circularity if the argument is followed. What defines a discipline? Its structure. Do disciplines differ in amounts of structure? Yes. Well, what is the minimum structure necessary? Enough to become a discipline. Ad infinitum, ad nauseam.

Instead, let us look again at the two definitional uses of structure. As a stipulative term structure exists. It is that which makes a discipline, and which separates one discipline from another and from non-disciplines. However, in its programmatic sense does structure inhere in every discipline, as the phrase "structure of the disciplines" would suggest, or is there a discipline which might not have what I call a teachable or an apprehendable structure? Remember, we are looking for something which facilitates the teaching and learning of a discipline.

Following Bruner's lead, a foremost spokesman for the concept of structure of the disciplines has been Joseph Schwab. He also sees structure as the parts of an object and the ways in which they are interrelated. Structure is a concept, a principle around which subject matter can be organized and understood. He sees no unity of knowledge because each discipline has its own principles. The "doctrine of the units of science is either a dogma or a hope, but not a fact."[5] For the same reason he finds it impossible to describe the substantive structures of the sciences in general. Instead, he organizes scientific structures into three categories: 1. Reductive — where the whole of the subject matter is treated in terms of its parts, e.g., chemistry; 2. Holistic — where parts are described in terms of their contribution to the whole, e.g., a classification scheme or physiology; 3. Rational — the scientist treats the subject matter in a manner determined by some rational system or structure within which the subject matter exists, usually a mathematically framework, e.g., astronomy.[6]

Schwab makes a fine case for structure, in both the stipulative and programmatic senses of the word. As a stipulative term structure is both the boundaries of a discipline and the conceptual framework within which the subject matter is studied, interpreted, and verified. In a programmatic sense Schwab argues, although less eloquently, for some of the same aims as Bruner. Both he and Bruner are much at home in

[5]G. W. Ford and L. Pugno (ed.), *The Structure of Knowledge and the Curriculum* (Chicago: Rand McNally & Company, 1964), p. 10.
[6]*Ibid.*, pp. 46-49.

describing various structures using scientific or mathematical examples. For instance, the structure of algebra is reducible to the commutative, distributive, and associative laws. The structural principle of embryology is the gradient theory.[7] While for Schwab the whole heavens can be understood in terms of the " . . . properties of ellipses and the consequences of centripetal forces which vary as the square of distance . . . ."[8]

All of this is fine, but where are the principle or principles around which some of the non-sciences are organized? Schwab won't enter that thicket, although Bruner does. The latter writes of language learning as grasping the "subtle structure of a sentence."[9] He might be right, but is this the structure of a discipline? Of how much value to an English teacher would be the knowledge that the structure of his discipline consisted of the "subtle structure of a sentence?" Bruner's attempts to give examples of structuring principles in history fall equally short. He writes of "the fundamental idea that a nation must trade in order to live . . . " By grasping this so-called structuring principle "the Triangular Trade of the American colonies becomes altogether simpler to understand . . . "[10] The knowledge that respiration is necessary to human life is undoubtedly important, but would it represent the structure of a discipline called physiology? The next example of structure is even more vague. Bruner says that "If a student could grasp in its most human sense the weariness of Europe at the close of the Hundred Years' War [*sic*] and how it created the conditions for a workable but not ideologically absolute Treaty of Westphalia, he might be better able to think about the ideological struggle of East and West . . . "[11] I would say that if a student does not come away from a study of the Thirty Years' War impressed by the havoc it wrought and the conditions, both cause and effect, it left in its wake, then he has only looked at but not understood that piece of history. However, this "grasping the weariness of Europe," is this to be construed as a structuring principle?

The simple fact, either unrecognized or passed over by Bruner and those who have seized structure as some bit of curricular magic, is that some disciplines have no apprehendable structure which will make the job of the teacher or curriculum maker easier. History has had no commutative or associative laws, no gradient theory, no Newton to order the heavens. What is a historical law? Historians have never agreed on that. All historians have probably given some thought to

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[7]Schwab jumps disconcertingly from the broadest to the very small. The gradient theory might very well be the structure of embryology, but I question very much whether embryology is a discipline. This penchant of Schwab's does detract from his work, but does not invalidate it.

[8]Joseph Schwab. "The Concept of the Structure of a Discipline," *Educational Record,* Vol. 43 (July, 1962), p. 48.

[9]Bruner, *op cit.*, p. 8.

[10]*Ibid.*, pp. 23-24.

[11]*Ibid.*, p. 25. Bruner has mismatched treaty and war. The Treaty of Westphalia ended the Thirty Years War.

historical laws, but most have given up the enterprise.[12] The written attempts at formulating historical laws have been few. There have been several discredited cyclical theories, and Turner's frontier thesis as well as the nineteenth century progress of mankind theory come to mind, but none, neither the attempt to understand all of American history in terms of an expanding frontier nor the belief that man's history proceeds inevitably towards a better life, is held by more than a few historians.

There is no apprehendable structure in history as the distributive law is an apprehendable structure for the study of algebra. The following is Bruner: "For it is structure, the great conceptual inventions that bring order to the congeries of disconnected observations, that gives meaning to what we may learn and makes possible the opening up of new realms of experience."[13] What are the great conceptual inventions in the discipline of history? What concept which, if grasped, would enable us to organize large bodies of historical information? Wars and revolutions have been researched as thoroughly as any facet of history, yet there is no theory of war or concept of revolution. We can't seriously consider Bruner's "weariness of Europe" as a great conceptual invention. It just isn't.

Forty years ago Neal Billings came up with 888 generalizations which were basic to the social studies. Since his topic was social studies some of the generalizations are more applicable to political science or sociology, yet I was not able to pick out one which had no relevance to history. The point is that if mathematics had 888 distributive or commutative laws it couldn't possibly be as structured as it is. Because history has a great many low-level generalizations, and no significant laws or "conceptual inventions," in no way detracts from its value or intrigue. It merely means that history cannot be pursued with the relentless logic inherent in the scientific or mathematical disciplines.

It had appeared to me that "structure of the disciplines" was being used by too many in an unstructured and undisciplined way. It seemed that the root of the problem was not whether every discipline had a structure nor whether one would rather teach structure than something else, but whether every discipline — ipso facto — had an apprehendable structure; something which in and of itself facilitated the teaching-learning process. Structure as something which can be grasped and used by teachers and curriculum people undoubtedly exists, especially in the mathematical and scientific disciplines. The same type of an apprehendable structure in history is not evident, and the sooner this notion is dispelled the better.

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[12]The University of Chicago historian Mark Krug says that few historians "have tried to find some order, rhythm, or structure in history . . . " and they have been only partially successful and endorsed by few fellow historians. Mark Krug. "Bruner's New Social Studies: A Critique," *Social Education,* Vol. 30 (October, 1966), p. 400.
[13]*Ibid.,* p. 400.