speaks of "profundity," "simplicity," "elegance," "coherence," and "intrinsic interest." [59]

We speculate that these characteristic values, attitudes, or "passions" are forged during the early studies in the disciplines. The style of the teachers and mature professionals at work helps attract students in the first place. Whitehead in *The Aims of Education* gives communication of the "romance of the subject" an important place in each lesson.[60]

A DISCIPLINE IS AN INSTRUCTIVE COMMUNITY

Perhaps the most notable book on curriculum published in the present day is *The Process of Education* by the aforementioned psychologist, Jerome Bruner. This report of the proceedings of a conference of scientists, psychologists, and educationists on the subject of education in the sciences speaks about a new and more effective conception of schooling. It is a short book, and it treats highly involved matters in simple and general terms. In the language developed earlier in this chapter, Bruner propounds a conception, principle of inquiry, or model for the educational process. Containing many threads of existing models for education but at the same time enunciating a new theme, the "Bruner thesis" (so-called because a book of his authorship brought it to general notice; not that he was the single and pioneer thinker to whom it can be attributed) has stimulated schoolmen to unfold and test his principle. As do all productive, seminal statements of principle, this one asks more questions than it answers. All theorists sponsoring existing conceptions of the curriculum find themselves confronted by his ideas.

The Bruner thesis states that the "curriculum of a subject should be determined by the most fundamental understanding that can be achieved of the underlying principles that give structure to that subject." [61] Bruner hypothesizes that the principle is the basis for the early success of new curricula in mathematics and the sciences.[62]

Bruner hypothesizes that learning structures of disciplines:

Is learning how things are related.
Makes a subject more comprehensible.
Slows forgetting.
Permits reconstruction of detail through patterns.
Is the main road to transfer of training.
Narrows the gap between advanced and elementary knowledge.
Leads to intellectual excitement.
Supplies bases for and enhances intuitive thinking.

Is the bridge to simplicity. (Therefore structures can be taught to anybody in some honest form.)
Provides a path for progression of learning in each discipline.[63]

Bruner makes a compelling assertion that teaching "that emphasizes the structure of a subject is probably even more valuable for the less able student than for the gifted one." [64]

Philip Phenix, contemporary philosopher and educational theorist, emphasizes the importance of the nature of disciplines to the curriculum of schools. "The distinguishing mark of any discipline is that the knowledge which comprises it is instructive—that it is peculiarly suited for teaching and learning." [65] Phenix expands this view in another article and notes that he is

. . . convinced that one of the secrets of good teaching is the practice of clearly charting a way through the subject of instruction, so that the students know how each topic as it comes along fits into the whole scheme of the course and of the discipline to which it belongs. They understand where they are in relation to what has gone before and to what is to be studied subsequently. The effect of such teaching is a growing appreciation of the inner logic of the subject, resulting at length in a grasp of its spirit and method which will be proof against the erosions of detailed forgetting.[66]

Phenix conceptualizes three fundamental features of disciplined knowledge, "all of which contribute to the availability of knowledge for instruction and thus provide measures for degree and quality of discipline." [67] The first quality is that of *analytic simplification.* Phenix asserts that:

All intelligibility rests upon a radical reduction in the multiplicity of impressions which impinge upon the senses and the imagination.

. . . . . .

It is commonly assumed that abstract thinking is difficult and complicated. This assumption betrays a misunderstanding of what abstraction is. Analytic abstraction is a way of thinking which aims at ease of comprehension and reduction of complexity. For this reason all learning—all growth in understanding—takes place through the use of simplifying concepts.

. . . . . .

Thus, contrary to the popular assumption, knowledge does not become more and more complicated as one goes deeper into a discipline. . . . The further one goes in it the more pervasive are the simplicities which analysis reveals.[68]

The second quality of disciplined knowledge according to Phenix is *synthetic coordination.*

What occurs in disciplined thinking is a reconstruction of experience. The brute multiplicity of primordial experience is simplified by conceptual abstraction, and these abstractions are then synthesized into more and more comprehensive patterns of coordination. . . .

Herein lies the great pedagogical virtue of a discipline. Whatever is taught within a discipline framework draws strength and interest from its membership within a family of ideas. Each new idea is illuminated by ideas previously acquired. A discipline is a community of concepts. Just as human beings cannot thrive in isolation, but require the support of other persons in mutual association, so do isolated ideas wither and die, while ideas comprehended within the unity of a discipline tend to remain vivid and powerful within the understanding.[69]

The third quality is *dynamism.*

By this [dynamism] is meant the power of leading on to further understanding. A discipline is a *living* body of knowledge, containing within itself a principle of growth. Its concepts do not merely simplify and coordinate; they also invite further analysis and synthesis. A discipline contains a *lure to discovery.* Its ideas excite the imagination to further exploration. Its concepts suggest new constructs which provide larger generalizations and reconstituted modes of coordination.

James B. Conant has pointed to this dynamism as a distinguishing feature of scientific knowledge. Science is an enterprise in which fruitfulness is the mark of a good conceptual scheme. Theories which merely coordinate and organize a given body of data but do not stimulate further experimentation and inquiry are scientifically unimportant. This principle may also be taken as definitive for any discipline. Instructiveness is proportionate to fruitfulness. Knowledge which only organizes the data of experience but does not excite further questions and inquiries is relatively undisciplined knowledge. Disciplined ideas not only constitute families of concepts, but these families beget progeny. They have generative power. This is why they are instructive. They lead on and out: they educate.[70]

A third contemporary curriculum theorist who points out the relationship between disciplined knowledge and learning is Joseph Schwab of the University of Chicago. Writing to high school biology teachers about the new curriculum of the American Institute of Biological Sciences, Schwab asserts that "an ideal invitation to enquiry" is an individual or collective enterprise which engages the student himself in one of the critical or investigative activities which constitute scientific enquiry.[71]

In a key statement in the recent literature on curriculum theory Schwab makes three assertions on the importance of the structures of the disciplines to education:

. . . they pose problems with which we in education must deal. The structures of the modern disciplines are complex and diverse. . . . The

diversity of modern structures means that we must look, not for a simple theory of learning leading to a one best learning-teaching structure for our schools, but for a complex theory leading to a number of different structures, each appropriate or "best" for a given discipline or group of disciplines.

. . . they are necessary to teachers and educators: they must be taken into account as we plan curriculum and prepare our teaching materials; otherwise, our plans are likely to miscarry and our materials, to misteach.

. . . they are necessary in some part and degree *within* the curriculum, as elements of what we teach. Otherwise, there will be failure of learning or gross mislearning by our students.[72]

The citations given above illuminate the idea that a discipline can be conceived of as a foundation for curriculum, the *only* sound foundation for a curriculum which emphasizes intellectual values. The educational implications of this point of view have been the focus of this book and are further developed in the succeeding chapters.

Several writers have noted unproductive curricular practices which stem from the problem of the mistranslation of disciplines in the process of curriculum design. Foshay, writing for The Association for Supervision and Curriculum Development, notes that "every academic school subject that we try to teach was originally based upon some discipline . . . . A school subject is a translation of a discipline into a pattern of learning." [73] Foshay proceeds to ask:

. . . how good is the translation? Is the subject of mathematics as we conceive of it in school true to the discipline of mathematics as a mathematician sees it? . . . In a good many cases our attempts to translate the discipline into viable subject matter that can be learned in school are a mistranslation, in the sense that learning method that we have developed has taken the place of the discipline. We have become subject-centered in fact; the subject is no longer relevant to the discipline. Our objection to the artificial and largely arbitrary nature of much school subject matter is derived from the fact that it is arbitrary, superficial material. It fails properly to represent the discipline out of which it came.

Listen to a series of charges. We have taught prosody in the name of poetry, thus killing an interest in poetry for ourselves and our descendants. We have taught grammar in the name of composition, destroying the possibility of a widespread ability to write good essays or even good expository prose. We have taught computation in the name of mathematics, and now we commonly say to one another, "The trouble is, the youngsters can do it, but they don't understand it." When we have taught phonics in the name of reading, we have produced in the early grades word-callers, not readers. We have taught place geography in the name of geography, almost killing this subject in the schools. No geographer says that this is what geography is. We have taught dates and battles in the name of history; I would say instead of history. An historian does not describe his discipline thus. Only in school do you get preoccupied with these matters

—never again. We have taught facts and principles in the name of science; but science is a mode of inquiry, and the scientists now say what we are doing is not only out of date, but it is not science.

The Physical Science Study Committee conceived a way of thinking of science that stems directly from the discipline, and that does not correspond to our tradition of subject matter in the schools. They have destroyed our subject matter; they could not modify it. They could not go gradually from where we are, for example, in physics in the secondary schools, to where they thought we ought to go. They had to destroy what we were doing and reconceive it from the bottom up.

Such reconceptions of the disciplines we mean to teach are the most important thing that is going on in education, because they are so fundamental. Such revision is very likely to go all the way through the subjects we teach.[74]

Schwab, speaking about the relationship between structure of a discipline and meaning to a body of knowledge, asserts that

. . . meaning is seriously distorted by replacing the appropriate structure by some other structure. Yet, in the past twenty years, we have warped and revised any number of subject matters in order to fit them to the bed of views about how and when and under what circumstances this or that is most readily learned. It would be well if, in future, we thought twice before we modified an item of knowledge in order to fit it to a psychological structure alien to it.[75]

Phenix holds that "we should not try to teach anything which has not been found actually instructive through the labors of hosts of dedicated inquirers." [76]

The distinction between *disciplined knowledge,* as used in this book, and *subject matter,* as this term has come to be defined by schoolmen in the first half of this century, must be made clear. The former means the disciplined substance and artful syntax of bodies of thoughtful men; the latter signifies the atomistic, unrelated, factual material which has been presented according to an inappropriate theme, or, worse, as a potpourri. Subject matter in this sense has been the bane of students and teachers in schools and colleges since the dawn of formal education. Neither we nor the writers cited above advocate a return to "traditional" pedagogy. On the contrary, we propose a new conception of curriculum which makes the long-standing educational argument between *child-centeredness* and *subject matter* unnecessary and unproductive. The fulfillment of each person's capacity for meanings through encounters with the significant realms of experience is the most humane of educational ideas.

RECAPITULATION

We have developed a representation of the world of knowledge from which we can devise a theory of curriculum. First, as developed in Chapter II, we accommodate to pluralism in the representation of knowledge. Second, we undertake that most dangerous game—the pursuit of *isomorphic* * features of the several autonomous disciplines. We find these isomorphic aspects:

A discipline is a community of persons.
A discipline is an expression of human imagination.
A discipline is a domain.
A discipline is a tradition.
A discipline is a syntactical structure—a mode of inquiry.
A discipline is a conceptual structure—a substance.
A discipline is a specialized language or other system of symbols.
A discipline is a heritage of literature and artifacts and a network of communications.
A discipline is a valuative and affective stance.
A discipline is an instructive community.

We now propose the community of discourse as a *theory model for* devising the theory of curriculum of schools which gives primacy to the claim of intellect. Every aspect of the theory model will lead to some corresponding part of the curriculum theory to be set forth. The theory model can be used to reflect back on each discipline in search of its clues for curriculum, not as a new synthetic discipline.

* An isomorph is something identical with, equal to, alike, or the same as something else in form, shape, or structure.

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1. Elizabeth Steiner Maccia, *Logic of Education and Educatology: Dimensions of Philosophy of Education*, Occasional Paper 64–160 (Columbus, Ohio: Educational Theory Center, Ohio State University, 1964), p. 15.
2. Harry S. Broudy, *Building a Philosophy of Education* (2d ed.; Englewood Cliffs: Prentice-Hall, Inc., 1961), p. 291.
3. See Philip H. Phenix, "The Use of the Disciplines as Curriculum Content," *Educational Forum*, 26 (March 1962), p. 274.

   In an earlier time, an interesting and quite similar point is made by John Dewey (1902), who eschews a firm separation between the "child" and "organized knowledge." See "The Child and the Curriculum," in *The Child and the Curriculum and The School and Society* (Chicago: The University of Chicago Press, Phoenix Books, 1956).

lect with respect to all other aspects of life. These arguments we believe transcend the conditions of social groups, national boundaries, and a limited view of time.

Whatever the bases for support, we propose the primacy of the intellectual claim on the content of the curriculum as the cornerstone of our theory. As a corollary, the ranking of the other claims will be determined by judgment. These other claims are not treated in this work.

While the school performs many functions, its chief one is curricular. The heart of the general curriculum is the disciplines of knowledge. Below we have set out a scheme for illustrating the functions:

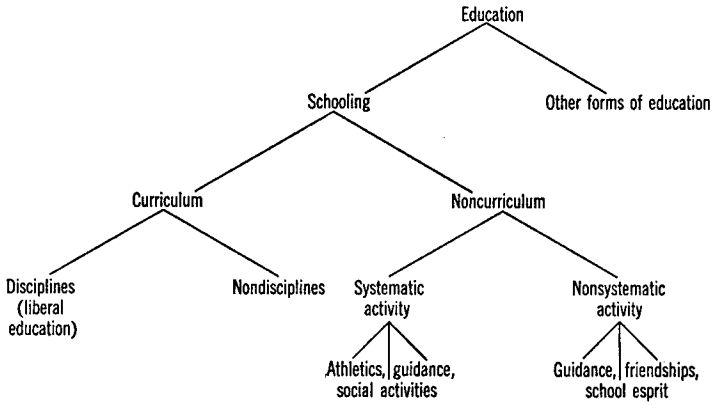

FIGURE 1

We have defined the school as a microcosm of the world of intellect. The curriculum in the disciplines is the heart of such a school. The curricular function is paramount. The nondiscipline curriculum—straightforward occupational, social, and personal training—should not under any circumstances replace an element of the liberal curriculum for any student. Occupational training desirably follows liberal studies and should occur just before the individual's departure from organized schooling. Preferably, occupational training should take place in a program designed for industry or an occupation and carried out in a special setting such as the technical institute, on-the-job-training program, armed services school, or other well-resourced special program. If the school is required by law or other mandate to teach nondisciplined matter in an organized fashion, it should use great ingenuity in locating such training (as driver education, grooming, or personal typing) in after-school hours, on Saturdays, or in summers. The noncurricular functions which are organized and financed by the school should be generally supportive of intellect and culture.