Physical and Social Studies

ALLUSION has already been made to the conflict of natural science with literary studies for a place in the curriculum. The solution thus far reached consists essentially in a somewhat mechanical compromise whereby the field is divided between studies having nature and studies having man as their theme. The situation thus presents us with another instance of the external adjustment of educational values, and focuses attention upon the philosophy of the connection of nature with human affairs. In general, it may be said that the educational division finds a reflection in the dualistic philosophies. Mind and the world are regarded as two independent realms of existence having certain points of contact with each other. From this point of view it is natural that each sphere of existence should have its own separate group of studies connected with it; it is even natural that the growth of scientific studies should be viewed with suspicion as marking a tendency of materialistic philosophy to encroach upon the domain of spirit. Any theory of education which contemplates a more unified scheme of education than now exists is under the necessity of facing the question of the relation of man to nature.

1. The Historic Background of Humanistic Study

It is noteworthy that classic Greek philosophy does not present the problem in its modern form. Socrates indeed appears to have thought that science of nature was not attainable and not very important. The

chief thing to know is the nature and end of man. Upon that knowledge hangs all that is of deep significance - all moral and social achievement. Plato, however, makes right knowledge of man and society depend upon knowledge of the essential features of nature. His chief treatise, entitled the Republic, is at once a treatise on morals, on social organization, and on the metaphysics and science of nature. Since he accepts the Socratic doctrine that right achievement in the former depends upon rational knowledge, he is compelled to discuss the nature of knowledge. Since he accepts the idea that the ultimate object of knowledge is the discovery of the good or end of man, and is discontented with the Socratic conviction that all we know is our own ignorance, he connects the discussion of the good of man with consideration of the essential good or end of nature itself. To attempt to determine the end of man apart from a knowledge of the ruling end which gives law and unity to nature is impossible. It is thus quite consistent with his philosophy that he subordinates literary studies (under the name of music) to mathematics and to physics as well as to logic and metaphysics. But on the other hand, knowledge of nature is not an end in itself; it is a necessary stage in bringing the mind to a realization of the supreme purpose of existence as the law of human action, corporate and individual. To use the modern phraseology, naturalistic studies are indispensable, but they are in the interests of humanistic and ideal ends.

Aristotle goes even farther, if anything, in the direction of naturalistic studies. He subordinates (ante, p. 254) civic relations to the purely cognitive life. The highest end of man is not human but divine - participation in pure knowing which constitutes the divine life. Such knowing deals with what is universal and necessary, and finds, therefore, a more adequate subject matter in nature at its best than in the transient things of man. If we take what the philosophers stood for in Greek life, rather than the details of what they say, we might summarize by saying that the Greeks were too much interested in free inquiry into natural fact and in the aesthetic enjoyment of nature, and were too deeply conscious of the extent in which society is rooted in

nature and subject to its laws, to think of bringing man and nature into conflict. Two factors conspire in the later period of ancient life, however, to exalt literary and humanistic studies. One is the increasingly reminiscent and borrowed character of culture; the other is the political and rhetorical bent of Roman life.

Greek achievement in civilization was native; the civilization of the Alexandrians and Romans was inherited from alien sources. Consequently it looked back to the records upon which it drew, instead of looking out directly upon nature and society, for material and inspiration. We cannot do better than quote the words of Hatch to indicate the consequences for educational theory and practice. "Greece on one hand had lost political power, and on the other possessed in her splendid literature an inalienable heritage. It was natural that she should turn to letters. It was natural also that the study of letters should be reflected upon speech. The mass of men in the Greek world tended to lay stress on that acquaintance with the literature of bygone generations, and that habit of cultivated speech, which has ever since been commonly spoken of as education. Our own comes by direct tradition from it. It set a fashion which until recently has uniformly prevailed over the entire civilized world. We study literature rather than nature because the Greeks did so, and because when the Romans and the Roman provincials resolved to educate their sons, they employed Greek teachers and followed in Greek paths." 1

The so-called practical bent of the Romans worked in the same direction. In falling back upon the recorded ideas of the Greeks, they not only took the short path to attaining a cultural development, but they procured just the kind of material and method suited to their administrative talents. For their practical genius was not directed to the conquest and control of nature but to the conquest and control of men.

Mr. Hatch, in the passage quoted, takes a good deal of history for granted in saying that we have studied literature rather than nature

because the Greeks, and the Romans whom they taught, did so. What is the link that spans the intervening centuries? The question suggests that barbarian Europe but repeated on a larger scale and with increased intensity the Roman situation. It had to go to school to Greco-Roman civilization; it also borrowed rather than evolved its culture. Not merely for its general ideas and their artistic presentation but for its models of law it went to the records of alien peoples. And its dependence upon tradition was increased by the dominant theological interests of the period. For the authorities to which the Church appealed were literatures composed in foreign tongues. Everything converged to identify learning with linguistic training and to make the language of the learned a literary language instead of the mother speech.

The full scope of this fact escapes us, moreover, until we recognize that this subject matter compelled recourse to a dialectical method. Scholasticism frequently has been used since the time of the revival of learning as a term of reproach. But all that it means is the method of The Schools, or of the School Men. In its essence, it is nothing but a highly effective systematization of the methods of teaching and learning which are appropriate to transmit an authoritative body of truths. Where literature rather than contemporary nature and society furnishes material of study, methods must be adapted to defining, expounding, and interpreting the received material, rather than to inquiry, discovery, and invention. And at bottom what is called Scholasticism is the whole-hearted and consistent formulation and application of the methods which are suited to instruction when the material of instruction is taken ready-made, rather than as something which students are to find out for themselves. So far as schools still teach from textbooks and rely upon the principle of authority and acquisition rather than upon that of discovery and inquiry, their methods are Scholastic - minus the logical accuracy and system of Scholasticism at its best. Aside from laxity of method and statement, the only difference is that geographies and histories and botanies and astronomies are now part of the authoritative literature which is to be

mastered.

As a consequence, the Greek tradition was lost in which a humanistic interest was used as a basis of interest in nature, and a knowledge of nature used to support the distinctively human aims of man. Life found its support in authority, not in nature. The latter was moreover an object of considerable suspicion. Contemplation of it was dangerous, for it tended to draw man away from reliance upon the documents in which the rules of living were already contained. Moreover nature could be known only through observation; it appealed to the senses - which were merely material as opposed to a purely immaterial mind. Furthermore, the utilities of a knowledge of nature were purely physical and secular; they connected with the bodily and temporal welfare of man, while the literary tradition concerned his spiritual and eternal well-being.

2. The Modern Scientific Interest in Nature

The movement of the fifteenth century which is variously termed the revival of learning and the renascence was characterized by a new interest in man's present life, and accordingly by a new interest in his relationships with nature. It was naturalistic, in the sense that it turned against the dominant supernaturalistic interest. It is possible that the influence of a return to classic Greek pagan literature in bringing about this changed mind has been overestimated. Undoubtedly the change was mainly a product of contemporary conditions. But there can be no doubt that educated men, filled with the new point of view, turned eagerly to Greek literature for congenial sustenance and reinforcement. And to a considerable extent, this interest in Greek thought was not in literature for its own sake, but in the spirit it expressed. The mental freedom, the sense of the order and beauty of nature, which animated Greek expression, aroused men to think and observe in a similar untrammeled fashion. The history of

science in the sixteenth century shows that the dawning sciences of physical nature largely borrowed their points of departure from the new interest in Greek literature. As Windelband has said, the new science of nature was the daughter of humanism. The favorite notion of the time was that man was in microcosm that which the universe was in macrocosm.

This fact raises anew the question of how it was that nature and man were later separated and a sharp division made between language and literature and the physical sciences. Four reasons may be suggested. (a) The old tradition was firmly entrenched in institutions. Politics, law, and diplomacy remained of necessity branches of authoritative literature, for the social sciences did not develop until the methods of the sciences of physics and chemistry, to say nothing of biology, were much further advanced. The same is largely true of history. Moreover, the methods used for effective teaching of the languages were well developed; the inertia of academic custom was on their side. Just as the new interest in literature, especially Greek, had not been allowed at first to find lodgment in the scholastically organized universities, so when it found its way into them it joined hands with the older learning to minimize the influence of experimental science. The men who taught were rarely trained in science; the men who were scientifically competent worked in private laboratories and through the medium of academies which promoted research, but which were not organized as teaching bodies. Finally, the aristocratic tradition which looked down upon material things and upon the senses and the hands was still mighty.

(b) The Protestant revolt brought with it an immense increase of interest in theological discussion and controversies. The appeal on both sides was to literary documents. Each side had to train men in ability to study and expound the records which were relied upon. The demand for training men who could defend the chosen faith against the other side, who were able to propagandize and to prevent the encroachments of the other side, was such that it is not too much to

say that by the middle of the seventeenth century the linguistic training of gymnasia and universities had been captured by the revived theological interest, and used as a tool of religious education and ecclesiastical controversy. Thus the educational descent of the languages as they are found in education to-day is not direct from the revival of learning, but from its adaptation to theological ends.

(c) The natural sciences were themselves conceived in a way which sharpened the opposition of man and nature. Francis Bacon presents an almost perfect example of the union of naturalistic and humanistic interest. Science, adopting the methods of observation and experimentation, was to give up the attempt to "anticipate" nature - to impose preconceived notions upon her - and was to become her humble interpreter. In obeying nature intellectually, man would learn to command her practically. "Knowledge is power." This aphorism meant that through science man is to control nature and turn her energies to the execution of his own ends. Bacon attacked the old learning and logic as purely controversial, having to do with victory in argument, not with discovery of the unknown. Through the new method of thought which was set forth in his new logic an era of expansive discoveries was to emerge, and these discoveries were to bear fruit in inventions for the service of man. Men were to give up their futile, never-finished effort to dominate one another to engage in the cooperative task of dominating nature in the interests of humanity.

In the main, Bacon prophesied the direction of subsequent progress. But he "anticipated" the advance. He did not see that the new science was for a long time to be worked in the interest of old ends of human exploitation. He thought that it would rapidly give man new ends. Instead, it put at the disposal of a class the means to secure their old ends of aggrandizement at the expense of another class. The industrial revolution followed, as he foresaw, upon a revolution in scientific method. But it is taking the revolution many centuries to produce a new mind. Feudalism was doomed by the applications of

the new science, for they transferred power from the landed nobility to the manufacturing centers. But capitalism rather than a social humanism took its place. Production and commerce were carried on as if the new science had no moral lesson, but only technical lessons as to economies in production and utilization of saving in self-interest. Naturally, this application of physical science (which was the most conspicuously perceptible one) strengthened the claims of professed humanists that science was materialistic in its tendencies. It left a void as to man's distinctively human interests which go beyond making, saving, and expending money; and languages and literature put in their claim to represent the moral and ideal interests of humanity.

(d) Moreover, the philosophy which professed itself based upon science, which gave itself out as the accredited representative of the net significance of science, was either dualistic in character, marked by a sharp division between mind (characterizing man) and matter, constituting nature; or else it was openly mechanical, reducing the signal features of human life to illusion. In the former case, it allowed the claims of certain studies to be peculiar consignees of mental values, and indirectly strengthened their claim to superiority, since human beings would incline to regard human affairs as of chief importance at least to themselves. In the latter case, it called out a reaction which threw doubt and suspicion upon the value of physical science, giving occasion for treating it as an enemy to man's higher interests.

Greek and medieval knowledge accepted the world in its qualitative variety, and regarded nature's processes as having ends, or in technical phrase as teleological. New science was expounded so as to deny the reality of all qualities in real, or objective, existence. Sounds, colors, ends, as well as goods and bads, were regarded as purely subjective - as mere impressions in the mind. Objective existence was then treated as having only quantitative aspects - as so much mass in motion, its only differences being that at one point in space there was

a larger aggregate mass than at another, and that in some spots there were greater rates of motion than at others. Lacking qualitative distinctions, nature lacked significant variety. Uniformities were emphasized, not diversities; the ideal was supposed to be the discovery of a single mathematical formula applying to the whole universe at once from which all the seeming variety of phenomena could be derived. This is what a mechanical philosophy means.

Such a philosophy does not represent the genuine purport of science. It takes the technique for the thing itself; the apparatus and the terminology for reality, the method for its subject matter. Science does confine its statements to conditions which enable us to predict and control the happening of events, ignoring the qualities of the events. Hence its mechanical and quantitative character. But in leaving them out of account, it does not exclude them from reality, nor relegate them to a purely mental region; it only furnishes means utilizable for ends. Thus while in fact the progress of science was increasing man's power over nature, enabling him to place his cherished ends on a firmer basis than ever before, and also to diversify his activities almost at will, the philosophy which professed to formulate its accomplishments reduced the world to a barren and monotonous redistribution of matter in space. Thus the immediate effect of modern science was to accentuate the dualism of matter and mind, and thereby to establish the physical and the humanistic studies as two disconnected groups. Since the difference between better and worse is bound up with the qualities of experience, any philosophy of science which excludes them from the genuine content of reality is bound to leave out what is most interesting and most important to mankind.

3. The Present Educational Problem

In truth, experience knows no division between human concerns and a purely mechanical physical world. Man's home is nature; his purposes

and aims are dependent for execution upon natural conditions. Separated from such conditions they become empty dreams and idle indulgences of fancy. From the standpoint of human experience, and hence of educational endeavor, any distinction which can be justly made between nature and man is a distinction between the conditions which have to be reckoned with in the formation and execution of our practical aims, and the aims themselves. This philosophy is vouched for by the doctrine of biological development which shows that man is continuous with nature, not an alien entering her processes from without. It is reinforced by the experimental method of science which shows that knowledge accrues in virtue of an attempt to direct physical energies in accord with ideas suggested in dealing with natural objects in behalf of social uses. Every step forward in the social sciences - the studies termed history, economics, politics, sociology - shows that social questions are capable of being intelligently coped with only in the degree in which we employ the method of collected data, forming hypotheses, and testing them in action which is characteristic of natural science, and in the degree in which we utilize in behalf of the promotion of social welfare the technical knowledge ascertained by physics and chemistry. Advanced methods of dealing with such perplexing problems as insanity, intemperance, poverty, public sanitation, city planning, the conservation of natural resources, the constructive use of governmental agencies for furthering the public good without weakening personal initiative, all illustrate the direct dependence of our important social concerns upon the methods and results of natural science.

With respect then to both humanistic and naturalistic studies, education should take its departure from this close interdependence. It should aim not at keeping science as a study of nature apart from literature as a record of human interests, but at cross-fertilizing both the natural sciences and the various human disciplines such as history, literature, economics, and politics. Pedagogically, the problem is simpler than the attempt to teach the sciences as mere technical

bodies of information and technical forms of physical manipulation, on one side; and to teach humanistic studies as isolated subjects, on the other. For the latter procedure institutes an artificial separation in the pupils' experience. Outside of school pupils meet with natural facts and principles in connection with various modes of human action. (See ante, p. 30.) In all the social activities in which they have shared they have had to understand the material and processes involved. To start them in school with a rupture of this intimate association breaks the continuity of mental development, makes the student feel an indescribable unreality in his studies, and deprives him of the normal motive for interest in them.

There is no doubt, of course, that the opportunities of education should be such that all should have a chance who have the disposition to advance to specialized ability in science, and thus devote themselves to its pursuit as their particular occupation in life. But at present, the pupil too often has a choice only between beginning with a study of the results of prior specialization where the material is isolated from his daily experiences, or with miscellaneous nature study, where material is presented at haphazard and does not lead anywhere in particular. The habit of introducing college pupils into segregated scientific subject matter, such as is appropriate to the man who wishes to become an expert in a given field, is carried back into the high schools. Pupils in the latter simply get a more elementary treatment of the same thing, with difficulties smoothed over and topics reduced to the level of their supposed ability. The cause of this procedure lies in following tradition, rather than in conscious adherence to a dualistic philosophy. But the effect is the same as if the purpose were to inculcate an idea that the sciences which deal with nature have nothing to do with man, and vice versa. A large part of the comparative ineffectiveness of the teaching of the sciences, for those who never become scientific specialists, is the result of a separation which is unavoidable when one begins with technically organized subject matter. Even if all students were embryonic scientific specialists, it is questionable whether this is the most

effective procedure. Considering that the great majority are concerned with the study of sciences only for its effect upon their mental habits - in making them more alert, more open-minded, more inclined to tentative acceptance and to testing of ideas propounded or suggested, - and for achieving a better understanding of their daily environment, it is certainly ill-advised. Too often the pupil comes out with a smattering which is too superficial to be scientific and too technical to be applicable to ordinary affairs.

The utilization of ordinary experience to secure an advance into scientific material and method, while keeping the latter connected with familiar human interests, is easier to-day than it ever was before. The usual experience of all persons in civilized communities to-day is intimately associated with industrial processes and results. These in turn are so many cases of science in action. The stationary and traction steam engine, gasoline engine, automobile, telegraph and telephone, the electric motor enter directly into the lives of most individuals. Pupils at an early age are practically acquainted with these things. Not only does the business occupation of their parents depend upon scientific applications, but household pursuits, the maintenance of health, the sights seen upon the streets, embody scientific achievements and stimulate interest in the connected scientific principles. The obvious pedagogical starting point of scientific instruction is not to teach things labeled science, but to utilize the familiar occupations and appliances to direct observation and experiment, until pupils have arrived at a knowledge of some fundamental principles by understanding them in their familiar practical workings.

The opinion sometimes advanced that it is a derogation from the "purity" of science to study it in its active incarnation, instead of in theoretical abstraction, rests upon a misunderstanding. AS matter of fact, any subject is cultural in the degree in which it is apprehended in its widest possible range of meanings. Perception of meanings depends upon perception of connections, of context. To see a

scientific fact or law in its human as well as in its physical and technical context is to enlarge its significance and give it increased cultural value. Its direct economic application, if by economic is meant something having money worth, is incidental and secondary, but a part of its actual connections. The important thing is that the fact be grasped in its social connections - its function in life.

On the other hand, "humanism" means at bottom being imbued with an intelligent sense of human interests. The social interest, identical in its deepest meaning with a moral interest, is necessarily supreme with man. Knowledge about man, information as to his past, familiarity with his documented records of literature, may be as technical a possession as the accumulation of physical details. Men may keep busy in a variety of ways, making money, acquiring facility in laboratory manipulation, or in amassing a store of facts about linguistic matters, or the chronology of literary productions. Unless such activity reacts to enlarge the imaginative vision of life, it is on a level with the busy work of children. It has the letter without the spirit of activity. It readily degenerates itself into a miser's accumulation, and a man prides himself on what he has, and not on the meaning he finds in the affairs of life. Any study so pursued that it increases concern for the values of life, any study producing greater sensitiveness to social well-being and greater ability to promote that well-being is humane study. The humanistic spirit of the Greeks was native and intense but it was narrow in scope. Everybody outside the Hellenic circle was a barbarian, and negligible save as a possible enemy. Acute as were the social observations and speculations of Greek thinkers, there is not a word in their writings to indicate that Greek civilization was not self-inclosed and self-sufficient. There was, apparently, no suspicion that its future was at the mercy of the despised outsider. Within the Greek community, the intense social spirit was limited by the fact that higher culture was based on a substratum of slavery and economic serfdom - classes necessary to the existence of the state, as Aristotle declared, and yet not genuine parts of it. The development of science has produced an industrial

revolution which has brought different peoples in such close contact with one another through colonization and commerce that no matter how some nations may still look down upon others, no country can harbor the illusion that its career is decided wholly within itself. The same revolution has abolished agricultural serfdom, and created a class of more or less organized factory laborers with recognized political rights, and who make claims for a responsible role in the control of industry - claims which receive sympathetic attention from many among the well-to-do, since they have been brought into closer connections with the less fortunate classes through the breaking down of class barriers.

This state of affairs may be formulated by saying that the older humanism omitted economic and industrial conditions from its purview. Consequently, it was one sided. Culture, under such circumstances, inevitably represented the intellectual and moral outlook of the class which was in direct social control. Such a tradition as to culture is, as we have seen (ante, p. 260), aristocratic; it emphasizes what marks off one class from another, rather than fundamental common interests. Its standards are in the past; for the aim is to preserve what has been gained rather than widely to extend the range of culture.

The modifications which spring from taking greater account of industry and of whatever has to do with making a living are frequently condemned as attacks upon the culture derived from the past. But a wider educational outlook would conceive industrial activities as agencies for making intellectual resources more accessible to the masses, and giving greater solidity to the culture of those having superior resources. In short, when we consider the close connection between science and industrial development on the one hand, and between literary and aesthetic cultivation and an aristocratic social organization on the other, we get light on the opposition between technical scientific studies and refining literary studies. We have before us the need of overcoming this separation in education if

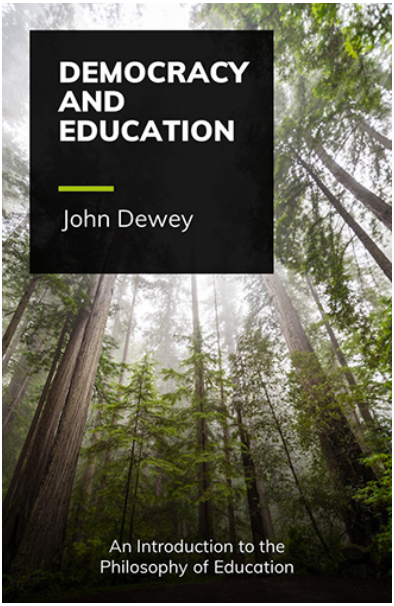
society is to be truly democratic.

Summary

The philosophic dualism between man and nature is reflected in the division of studies between the naturalistic and the humanistic with a tendency to reduce the latter to the literary records of the past. This dualism is not characteristic (as were the others which we have noted) of Greek thought. It arose partly because of the fact that the culture of Rome and of barbarian Europe was not a native product, being borrowed directly or indirectly from Greece, and partly because political and ecclesiastic conditions emphasized dependence upon the authority of past knowledge as that was transmitted in literary documents.

At the outset, the rise of modern science prophesied a restoration of the intimate connection of nature and humanity, for it viewed knowledge of nature as the means of securing human progress and well-being. But the more immediate applications of science were in the interests of a class rather than of men in common; and the received philosophic formulations of scientific doctrine tended either to mark it off as merely material from man as spiritual and immaterial, or else to reduce mind to a subjective illusion. In education, accordingly, the tendency was to treat the sciences as a separate body of studies, consisting of technical information regarding the physical world, and to reserve the older literary studies as distinctively humanistic. The account previously given of the evolution of knowledge, and of the educational scheme of studies based upon it, are designed to overcome the separation, and to secure recognition of the place occupied by the subject matter of the natural sciences in human affairs.

1 The Influence of Greek Ideas and Usages upon the Christian Church. pp. 43-44.



Dewey, J. (2018). *Democracy and Education (1st ed.)*. EdTech Books. Retrieved from https://edtechbooks.org/democracyandeducation