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WHAT IS SOCIAL SCIENCE?

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LIKE many another English word, science is used in a variety of senses from knowledge or comprehension to art or skill and its meaning in any context must be judged from that context. The usual meaning seems to be knowledge gained by systematic observation or knowledge coordinated and systematized, *i.e.*, science, referring whether to method of gaining knowledge or to a body of knowledge, implies something more than sporadic activity. There is often contrast between science and art as may be illustrated by a quotation from Ruskin ("The Eagle's Nest"):

> In science you must not talk before you know. In art you must not talk before you do. In literature you must not talk before you think. . . . Science—the knowledge of things, whether Ideal or Substantial. Art—the modification of Substantial things by our Substantial Power. Literature—the modification of Ideal things by our Ideal Power.

It will be noted that Ruskin does not here emphasize the systematic nature of that knowledge which is science, but inasmuch as without a certain degree of continuity there could hardly be art or literature I take it that the passage must imply the same of science.[1]

[1] Whether it is justifiable to place this interpretation on Ruskin's words may be questioned. Certainly his primary definition of science is sheer factual knowledge. "It is not the arrangement of new systems, nor the discovery of new facts, which constitutes a man of science; but the submission to an eternal system; and the proper grasp of the facts already known." (Art. 37) "We are so much, by the chances of our time, accustomed to think of science as a process of discovery, that I am sure some of you must have been gravely disconcerted by my requesting, and will to-day be more disconcerted by my firmly recommending, you to use the word, and reserve the

There is often an antithesis drawn between pure and applied science of much the same import as that which Ruskin draws between science and art. The physicist is interested in physics as physics without regard to what he can do with that knowledge other than develop more physics; the engineer takes the physics and uses it for his engineering purpose. It is safe also to say that the engineer has to use something besides physics, he has to use his judgment in applying physics to his engineering purposes, and this means that he is in part at least an artist. In the same way medical practice has to be more than an application of unmodified medical science. Such a difference may be illustrated, perhaps with overemphasis, if one asks about the science versus the practice of billiards or golf. The science of golf is a matter of ballistics of an elastic body impelled by a blow from an elastic body and moving through an elastic and resisting medium to strike the earth and move on. This is a very complicated situation requiring for its discussion a deal of complicated mathematics, some of which was supplied by P. G. Tait, some more by subsequent writers, and some not yet available. It is not clear that the perusal of Tait's work could be of any assistance to a golfer in playing his game; indeed, I imagine that few golfers could follow Tait's theory and surely one would not require the science as a prerequisite to that practice by which the art of good golfing is acquired. Here the pure and applied sciences are probably, as in much of medicine and in some of engineering, largely dissociated; it is to be doubted if Tait became a better golfer by virtue of his profound studies, it is probable that the studies were suggested through his interest in the game and his intellectual curiosity to ascertain how much of the game he could explain by application of his mathematical technique.

thought of science for the acquaintance with things long since discovered, and established as true." (Art. 65) While such statements could be interpreted as limiting science as he uses it to facts, phrases like "proper grasp" may imply a considerable continuity or systematization of the knowledge. Further there are passages like that in Art. 134 in which Ruskin calls upon scientists to explain the formation of bubbles—something that really implies the inclusion of established theory as a part of our established knowledge. So, too: "Science does its duty, not in telling us the causes of sunspots; but in explaining to us the laws of our own life, and the consequences of their violation." (Art. 206) And theology is placed as the highest of the sciences: "The effect, for instance, upon your temper, intellect, and conduct during the day, of your going to chapel with or without belief in the efficacy of prayer, is just as much a subject of definite science, as the effect of your breakfast on the coats of your stomach." (Art. 67.) So far as concerns the artist in his work Ruskin specifically limits more sharply the meaning of science to facts concerning the looks of things: "I told you that I did not mean by 'science' such knowledge as that triangles on equal bases and between parallels are equal, but such knowledge as that the stars in Cassiopeia are in the form of a W." (Art. 124)

According to the "Century Dictionary" social science is:

> The science of all that relates to the social condition, the relations and the institutions which are involved in man's existence and his well-being as a member of an organized community. It concerns itself more specially with questions relating to the public health, education, labor, punishment of crime, reforming criminals, pauperism and the like. It thus deals with the effect of existing social forces and their result on the general well being of the community, without directly discussing or expounding the theories or examining the problems of sociology, of which it may be considered a branch.

Another dictionary might well give another definition. Some persons would say that the social sciences were economics, government or political science, history, sociology, social psychology and cultural anthropology—omitting education, public health, law, administration and other topics or perchance including them. Others might say that social science dealt scientifically with social situations, *i.e.*, with situations involving more than one person. It may be entertaining to note that according to the "Century Dictionary" economics is the "dismal science," which is annotated "humorous" without vouchsafing any information as to whether this humorous use of dismal refers to "gloom, melancholy, dolor" or to "a tract of land, swampy in character, often covered by a considerable thickness of half-decayed wood and saturated with water."

For whatever meaning may be attached to the word social science, it would seem that the significance of the noun science is at least as crucial as that of the adjective social; and as it has been seen that this noun is used in a great variety of senses and further as we are aware that most of whatever may be social science probably appears in written form, we may perhaps be permitted to examine the meaning of social science in the light of Ruskin's definitions: In science you must not talk before you know. In art you must not talk before you do. In literature you must not talk before you think.

Consider Plato's "Republic." The reason I invite your consideration of this work is because I rarely have attended a doctoral examination in the social science field but what the candidate has been asked questions respecting it. From this I infer that Plato's "Republic" must be a contribution of so great importance to social scientists that they expect their students to be familiar with it. This seems not to be true of the "Lamentations" of Jeremiah or of the "Revelation" according to St. John. How would the "Republic" classify under Ruskin's trilogy? Did Plato here talk before he knew? If so we can not rate it as science. How could he have known some of the things of which he talked—as, for example, of the communism of

property and of children among the ruling class? What criteria of knowledge could be applied of so biting a character as would drive other observers to draw the same inferences? As a matter of fact did not Aristotle draw quite the opposite inferences? And who shall decide and how shall he decide between Plato and Aristotle? In making a scientific decision one looks to the facts for enlightenment and for direction. It seems, at least to me, that we have to infer that Plato had not the facts, that he was expressing opinion about many matters on which it would be almost impossible to bring facts to bear—almost though conceivably not quite so difficult as to bring them to bear upon some of the matters in the "Revelation."

I infer therefore that Plato's "Republic" is not science. Is it art? That is, did Plato *do* before he talked? Had he an experience in social action whereby what he said could be rated fairly as a modification of substantial things by his substantial power? You may have information or inspiration on which you would answer: Yes. I have not and should be obliged to answer: No. On the other hand it does seem clear to me that Plato had thought before he wrote and that his "Republic" may well be characterized as a modification of ideal things by his ideal power and hence should be rated as a work in social literature. Indeed so great is the ideal power which shines out over the ideal things, so greatly are these things modified by that power, that none would hesitate ranking the work well toward the top of social literature.

We might turn next to F. S. Oliver's "The Endless Adventure" which is an account of Walpole's administration of the government of England. As I read this work it is a penetrating analysis of action—not Oliver's, to be sure, but Walpole's. In this respect the work differs from writings of Lord Haldane or of Lord Chesterfield on public administration, or of Chester Barnard on the function of the executive, all of whom actively engaged in administration; they did before they talked. However, we do not have much serious writing at an academic level by those active in public life or in business and I believe that in applying Ruskin's classification we should include in science, art and literature respectively the work of those who discuss the knowledge, action or thought of others. Where I asked above: Did Plato do before he talked, I had as lief ask: Had anybody done these things of which Plato talked? With this understanding we should classify Oliver's work as one of social art. In so doing I would not imply that Oliver does not propose some working hypotheses with respect to principles of action in the political field which if substantiated would be scientific laws of such action. Nor do I suggest that Oliver's work itself is not literature. All I am trying to do is to classify it essentially in the spirit of Ruskin's statement.

Let us try W. G. Sumner's "Folkways." As its name indicates this deals with the behavior of peoples. The author collected from many sources, compared and arranged for his undergraduate course a variety of folkways. He was not trying to show how various peoples ought to behave, but rather how they did behave and what values they held. The book should I think be rated as social science—at the descriptive or taxonomic level. It has not all the systematization or coordination which we might like to see applied to the field of its interest, but that is true of many a good text in science. It has not a theory attached to it as printed. Sumner once told me it was a case book and that if he lived long enough he might follow it with a theory of society. Theories that precede cases like Plato's "Republic" are very likely to be literature, a collection of cases that precedes theory may well rate as scientific data. Herbert Spencer had an evolutionary theory of society which he tried to substantiate to some degree with facts, but it is my belief that to-day most sociologists regard the known facts as not competent to prove the evolutionary theory of society in any such sense as the known biological facts prove the theory of biological evolution.

The literary tradition in the social sciences is very strong. By this I most certainly do not mean the tradition of fine literature. Those who practice the literary tradition may be very indifferent writers and very indifferent thinkers—they are merely those who deal with modifications of ideal things by their ideal power, however limited, with no particular control over those processes by facts, indulging in lengthy dialectic, often extremely clever, without starting from nor ever coming to statements which could be controlled by facts. Indeed unless I am much mistaken, so great is the prestige of this sort of thinking and writing on the part of those who are in a position to award recognition for work in social lines that many a young fellow might better imitate Plato's "Republic" badly than Sumner's "Folkways" well; yet if we are to advance scientifically in the narrow sense it would more likely be through constant revision, systematization and extension of the "Folkways."

Not long ago I was sitting with a group of thoughtful persons, mostly educators, when one of them asked another: What do people up your way think of the present European situation? His reply was: They don't think, they merely *emote*. I know of the transitive verb *emove*, though it is rare; I can find little justification for the intransitive *emote*, but it seems to be coming sparingly into use and perchance before long it will be in good usage. We need some word for abandoning one's self to one's emotions, for this is a common phenomenon. Many is the time that one does not know, nor do, nor think, but does *emote*. Maybe it should not be so. Maybe in those quiet

Victorian days Ruskin would not have done so nor admitted that any English gentleman would do so. The forebrain was then supposed to have ascendency over the midbrain and passion to be thereby restrained. Still this may have been a condition contrary to fact. Persons were supposed to be logical, but non-logical actions were then presumably very common as they are now. If in science one does not talk until he knows, in art until he does and in literature until he thinks, in what shall we say it is that one does not talk until he *emotes*? We need a word for that something, and I daresay the Greeks may not have had a name for it.

Consider Marx's "Communist Manifesto" written when he was twenty-nine. I shall not cite his "Kapital" which appeared twenty years later. The "Manifesto" is a diatribe against the bourgeoisie. However much it may be founded on knowledge, action or thought, its form and spirit appear to me to be in the same class as the hellfire and damnation sermons which are said to have been frequent right here in New England in earlier days; it is a work of a modern Hebrew prophet calling upon the people to renounce Baal and his idolatries and follow only the true Jehovah of whom Marx offers himself as the true prophet. It is shot through with emotion and is an appeal to emotions. And when we use the term emotion here we are not thinking of the rich sensuousness of art, nor of the strong sentiment of literature, and still less are we thinking of the intellectual estheticism of science; we are in the presence of hate and perchance of rage—as of one who hates the devil and rages against all his works. Where would Ruskin place the "Manifesto"? Where would he place "Nine long Harvards and three times three" which ring out these Autumn Saturday afternoons? So far as I gather the meaning of the "Eagle's Nest," I judge he had small place for them.

Just as we may need the word *emote* to signify abandonment to emotional reactions so we may need a word to denote those verbal productions which come direct from emotion and are intended to appeal directly to the emotions of the hearer or reader and thereby to incite him by sympathy to action. Shall we call them slogans or emotives or propaganda? Shall we supplement Ruskin and say: In propaganda you must not talk before you emote? At any rate, whatever be the terminology adopted I think we must readily agree that there is here something important which should be pointed out. In particular it should be pointed out for the purposes of this discussion of "What is Social Science" because it is surely true that the phrase social science as used to-day covers not only Ruskin's three gentlemanly categories but this fourth which we have been trying to portray and which may be socially more influential than the other three put together in about that proportion by which the proletarians exceed the bourgeoisie in the population. And shall we add to the definition of Art as the modification of Substantial things by our Substantial Power and to that of Literature as the modification of Ideal things by our Ideal Power a definition of propaganda as the modification of Substantial things by our Ideal Power, which may well be a polite characterization of lies, or as the modification of Ideal things by our Substantial Power, which might be a fair definition of forcible indoctrination?

If we use science in the strict sense of knowledge systematized and coordinated and generally accepted by professionally competent persons we have, I fear, to admit that there is very little social science. Many a time I have sat at the Social Science Research Council or at committee meetings at Harvard or elsewhere, when in groups of social scientists the conversation has turned to questions of their science. Under such circumstances one generally listens to disputes between different opinions which those participating hold and try to substantiate, each against the others, by appeal to reason or argument rather than by appeal to facts. If perchance somebody should point out that among natural scientists there would be more general agreement, the answer comes back that the questions under discussion are on the border line of research and that agreement should not be expected any more than a few years ago agreement on the meaning of experiments on cosmic rays was attainable as between Millikan and Arthur Compton or agreement as to the expanding, contracting, vibrating or stationary universe could be had between astronomers. It is of course a just observation that we do not expect agreement at the research line. If, however, one counters this observation by asking what it is that is known scientifically in the social field, the reply is something vague—such as that "there is a great body of economic science on which all or most economists are in agreement as is true of physics." When, however, one gets down to brass tacks and presses for the specification of something agreed upon from out of this great body of economic knowledge, one finds hesitancy; and if by an excess of daring some member of the group ventures some definite proposition as known, his confrères cry out that they do not agree. Statistically speaking, I have seen this sort of thing happen often enough under serious circumstances and have seen the contrary, namely, the successful specification of scientific knowledge, occur so infrequently that I am led to my inference that there is not much that is social science. There are, to be sure, as always, possible avenues of escape from such a particular inference; one might, for example, conclude that the social scientist is simply not interested in whatever it is that is known.

To me this would not be so ominous a situation were

it not that some of those least able or willing to concentrate on the scientific content of their science are among those most actively advocating social and economic control. Now while it is true that we have had and still have some empirical forms of materialistic control without a sound basis in natural science we have come from experience to know that such empirical control is validated only when it has been tried and has been observed to work time and time again so that each particular realized form of such control has attained that kind of uniformity of success which itself represents a scientific fact, and we do not expect a new attempt to be successful unless it is but a very slight modification of an old form; but on the other hand from the rapid and successful advances of the past century we have acquired the belief that the surest and safest way to gain new forms of control is through basing them soundly on ascertained science. How the situation in the social field can be different is difficult to see; those who advocate new types of social control may advocate them as experiments (though they rarely do, for they generally advocate them as rights or duties), but must be prepared for serious failure to achieve ends and even for the appearance of tragedies—unless and until a social science has been developed from which the results of the experiment can be predicted with assurance.

Turning now from social science in the strictly scientific sense we find a great deal of social science of the literary type, of which some might be converted into true science by careful investigation but of which much seems not to be so formulated as to admit of this conversion. And there is also a great deal of social art or action which might be so subjected to study as to yield accredited science. A scientist is a fellow who has technical competence to give a proof which is valid. In this connection I would refer to Chester Barnard who writes:[2]

> Whether the present essay is a contribution to the science hoped for remains to be determined by others. What has been presented is a hypothetical scheme which at present explains roughly to me what I have observed in many years of practical work with organizations of various kinds and what I have constructed from the experience of others, supplemented, of course, by a little knowledge of the social sciences. It is not the work of a scientist or scholar, but rather of an interested student of affairs.
>
> For this reason perhaps its chief value, if presently it has any, will merely lie in its expression of one view of experience. By it I have at least submitted my mental processes in this field to inspection. If it has any further value it will lie in the suggestion it may give to more competent inquiry, which I hope can be undertaken.

The work may not be science, the author does not rate it as such and I have ventured to follow him in this; but it is written more in the scientific spirit than many a work by a professional social scientist and is, I believe, in such form that it can be put to the tests that will convert it into science. Are there persons who have the technique and the interest to take up the author's invitation?

When my father was a student at Yale College, 1861–1865, the curriculum was largely classical. Greek, Latin, mathematics and rhetoric were the mental pabulum of the first two years. In the third year they continued with the addition of some natural science which went on into the senior year. The only subjects which could be considered as social science were in this last year. Here we find in the first of the three terms:

> History and political philosophy—Guizot's "History of Civilization," political economy begun, 4 lectures a week for 7 weeks by Pres. Woolsey;
>
> Mental philosophy—Hamilton's "Metaphysics," 4 lectures a week for 7 weeks by Prof. Porter, later president.

In the second term we find:

> History and political philosophy—Political Economy finished, Lieber's "Civil Liberty and Self Government," 4 lectures a week for 7 weeks by Pres. Woolsey;
>
> Moral philosophy—Stewart's "Active and Moral Powers," Butler's "Sermons," Hopkins' "Moral Science," 4 lectures a week for 7 weeks by Prof. Porter;
>
> Theology—Paley's "Natural Theology," Butler's "Analogy."

In the final Senior term:

> Political philosophy—Law of Nations;
> Constitution of the United States;
> Theology—Paley's "Evidences of Christianity."

I cite this program as indicating the climax of college education in those days at what was undoubtedly one of our best colleges. The catalogue listed no professor of social science—the President took this rôle—and presumably very ably, he was a real man. Porter was professor of moral philosophy and metaphysics; he was also in the faculty of divinity. W. B. Clarke who taught theology to the seniors was professor of divinity but his name does not appear in the list of that faculty, only in the list of the faculty of the academical department. Dutton who gave the fourteen lectures on the Constitution was from the faculty of law and his name does not appear among those of the faculty of the academical department. The point which I would make is that the social and moral sciences or philosophies were apparently treated along with theology as comparable and culminating parts of a liberal education. There is little likelihood that the scientific aspects of any of them were emphasized but the maturity and caliber of the men who gave them and the high standard of the texts which were used is adequate evidence that they were good liberal education. Moreover, when estimating what the students on

[2] "Function of the Executive," p. 292.

graduation knew about man one must take into account the tradition of education in the classics at that time which was to give attention to the life and ideas of ancient times—the reading of Thucydides was not just an exercise in the Greek language or literature but one in the interpretation of history.

The situation of the social subjects in the colleges to-day is very different. There are numerous courses and a large staff. The increase in the time given by undergraduates to the social studies has been very great, until at the present time the concentration in these fields amounts in some colleges to about one half of the whole. There is great attention to current and recent problems whereas as of my father's time there seems to have been relatively little. That those of our students who concentrate to-day in the social fields learn far more of their detail than students learned seventy-five years ago is certain, but it seems equally certain that those who concentrate in other fields by the very intensity of their concentration may have a far less philosophic outlook upon society than did all the students of those days. What the place of the social studies is or should be in present collegiate education I am not prepared at this time to discuss; were I to discuss it I should probably make some plea for a greater attention to law, education, public health, and possibly administration difficult though that subject is, than is usually accorded to them in such discussions. Furthermore, no matter how much I would emphasize the necessity for professionals to lay more stress on the strictly scientific aspects of social science or however much I might urge that even the collegian might be shown what is definitely known, I should be likely to suggest that where so little is known it would be well to consider the social sciences not as individual branches of learning but as an interest in man, reaching out even to theology as they did at Yale—for who shall assert that man lives by bread alone or that an ideology that triumphs over material conditions does not have to approach to a religion?

ISOSTATIC CONTROL OF FLUCTUATIONS OF SEA LEVEL

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WITH the last retreat of the North American continental ice sheets the northerly drainage of the land was impounded by the ice front at various stages till, with the vanishing of the ice, it finally flowed freely to the ocean. The lakes so formed waxed in size as the ice front receded; but the only escape for their waters was to the south, over cols in the continental divide. There were many of these lakes, large and small, each with its own level of overflow, which remained approximately constant as the lake expanded. The shores of all of them, as they came against the emerging land slope of their respective basins, carved or built shore features, which are in most cases perfectly preserved to this day. At the time of their formation these shore features were of course level, but to-day they are for long stretches inclined to the horizon, up to the north. This inclination of the once level strand lines is due to a tilting of the surface of the earth, and affords an angular measure of the tilt, which is usually expressed in inches or feet per mile. The constant display of tilt up to the north, on the periphery of basins vacated by continental ice sheets to form lakes, has suggested to geologists that the rise is due to relief of load, consequent on the vanishing of the ice and the complete or partial draining of the lakes. This belief is now very generally held. It means that geologists have accepted the view that the earth's crust may be depressed by a local load upon its surface, and recover from the depression when the load is removed. That is, they have accepted isostasy as a valid doctrine. The phenomena of regularly titlted shore lines are perhaps the most impressive and convincing proof of the truth of that doctrine.

Isostasy means equality of mass, per unit of horizontal cross section, in all large vertical columns of the earth. The imposition in the Pleistocene of a broad load of ice, let us say one kilometer thick, upon a portion of the earth's surface threw the column carrying that load out of balance with the rest of the earth. The ice mass came from the ocean; and the column, the top of which is the sea surface, lost load, and was thus also thrown out of balance with the rest of the earth. The unglaciated portions of the continents were neither loaded nor relieved of load, but in glacial time they were nevertheless also temporarily out of balance with both glaciated and oceanic regions, in different degree. The whole disturbance was caused primarily by the transfer of load from the ocean to the glaciated region. If a load equivalent to that of the ice had been shifted in depth from below the ice to the region below the ocean, with uniform distribution as to both removal and addition, balance would have been restored over the whole earth. Since the gravitative tendency to restore isostatic balance, however disturbed, is always active, it is presumed that continental glaciation actually induced the shift of mass in depth from the loaded continental column to the un-