L E C T U R E I V .

THE SOCIAL ORIGIN OF OUR FUNDAMENTAL IDEAS.

In the present lecture I approach the most important problem with which we shall have to deal. We have seen how profoundly both what we know, and the whole spirit of our intellectual life, is dependent upon social conditions. I now shall endeavor to show you how some of the most fundamental and important of our beliefs are determined by the fact that our intellect has a social origin. If you look over the whole field of human belief it is easy to classify our opinions into two great groups. The first group consists of more or less probable opinions about facts. To this very large group, belongs whatever you hold to be true concerning your calling and concerning the constitution, the laws and the history of the world with which you are acquainted. These propostitions are all characterized by the fact that while we believe them to be true you do not see any reason why any one of them is necessarily true. They are so because you find them to be so. They might have been otherwise. At the battle of Hastings, the Normans triumphed. You know or believe that to be true, but there is no necessity about it. This need not have been so. The Saxons might have triumphed for all that you can see to the contrary. In another sphere of your knowledge it is true that water freezes at thirty two degrees

Fahrenheit. This is true, this is a matter of fact. But you do not see any necessity why it must be so. The world might have been different. Truth of this kind is called contingent. You will see at once that throughout the whole range of your knowledge you have to do with countless fact of this sort, facts of which you can only say, it is so. You are unable to say , it must be so. On the other hand there is a ~~comparatively small~~ very important group of beliefs which relate to what is generally believed to be necessary truths. There are some beliefs of which we say, not "It is so," but "It must be so; I cannot conceive of them otherwise." ~~The range of these beliefs comparatively small, not because there are only a few such truths, but because, in comparison to the other truths or matters of belief they fill up but a small portion of our lives. There are many cases where you can say with confidence, "It must be so;" but the proportion of these cases to the others is limited.~~ That two and two make four is such a necessary truth. It not only happens to be so , but it must be so. If anybody were to tell you that in some other world water does not freeze, whatever the temperature, you might think the belief more or less improbable, but you would not think it impossible. You would be prepared to accept it upon sufficient evidence, and then to inquire into the cause of this anomalous behavior of water in the otherworld. But if anybody were to tell you that there is a world where two and two make five, you would say, "That is impossible; That cannot be." Thus matters of fact differ from necessary truth. The matters of fact might be otherwise. The necessary truths are conceived as eternal, unalterable, independent of this or of that place or time. The difference between necessary truths and mere matters of fact has aroused attention ever since men began to reflect; and a great deal of philosophical discussion ~~circles~~

about the origin of this difference between two so widely contrasting forms of belief or of knowledge.

On looking closer at the matter, however, we can see that the necessary truths, however, the truths that must be so, are at least in part of a nature to involve no very special puzzling features. For a very little reflection is sufficient to show us both the origin and the nature of a great many such truths. Many such truths, namely, are mere expressions of what I see to be involved in the meaning of some thing that I have already said or believed. Such truths contain nothing mysterious. Their necessity involves nothing that appears to conflict with the fact that we are unable, as observers of the world to decied beforehand what must be in the world. Every time that I observe a fact, and report that fact, I express a somewhat complicated idea. If I think over what I mean by this idea, I discover something to be involved in this meaning. I can now declare that this which is implied in what I say or report, must necessarily be true, if what I report is true. And in such a case the necessity that I observe contains nothing which conflicts with the mere matters of fact that I observe all about me. Thus it is a mere matter of fact that a given object A is to the right of a given object B. But if A is to the right of B it then necessarily follows that B is to the left of A. So far, I have necessary truths, but I get them merely by observing what is involved in my own meanings or reports. I cannot report matters of fact without in this way implying truths, which, as implied in my meaning, become then necessary; that is, if the facts are real, such and such implied meaning s necessarily follow.

Now, as a fact, most of the socalled necessary truths are obviously of this kind. To assert that they must be true, is nothing whatever but to assert that your meaning implies such and such conse-

quences. And the truths of the sort that I mentioned before, such truths as that two and two make four are plainly of this sort. I know that two and two must make four, simply because that is implied in my meaning, and so far the world of necessary truths involves nothing more than what we discussed at the last time, namely the existence of our power to reason, or to know what we mean by our ideas. But not all necessary truth is of this very common place sort. There are a great many propositions which a man believes to be sure, and which are still neither reports of matters of fact, nor mere observations of what is implied in a man's own meaning. An example of such a belief, is the belief is that whatever happens must have a cause. Another example is our belief that two straight lines cannot enclose a space. Beliefs of this sort go beyond what we have ever observed ouselves, and they also go beyond a mere report of what is implied in the ideas that report matters of fact. And necessary truths of this grade have been called Fundamental Truths, Axioms, Eternal Verities, and other names that are meant to imply, first that they must be true, and that they are subject to no contingency, and are more than mere reports of fact; and secondly, that the human mind gets them, not by a mere analysis of what our ideas mean, but by an assurance that enables us in advance to predict the yet unseen truth. Now it is necessary truth of this sort that is peculiarly mysterious. Let us briefly simplify such truths. Men have always looked for the causes of things. Savages did so. We still do so. In looking for the causes of things, men have always gone beyond a mere report of observed facts. They have always held that the order of the world has something necessary about it, and that this necessity was somehow known to be true in advance of definite experience. Again, men have always believed in an outer world of matter which they conceived to be existent independently of their own experience of its existence.

That is they have believed the world existed before there were any ment to observe it. Now any such belief obviously goes beyond any report of observed facts. No man ever observed that the world existed before there were men to observe it. Yet every man believes this to have been the case. If asked why he believes this, a man replies, "It must be so. This depends upo n fundamental necessity. It is inconceivable that the world should ever have begun to exist, unless it was created, at some moment of time, by a being whose antecedent existence is then presupposed. Something then must have existed from all eternity, and consequently something must have existed before man came." Such beliefs are examples of our so-called fundamental truths. Such beliefs are not reports of matters of fact, they are not mere observations of what is implied in a given idea, in case that idea happens to be true. On the contrary they are assertions that there are ideas which must be true, in advance of any experience, apart from any verification or report of particular facts.

I need not here undertake to give any complete list of these fundamental truths. You are all more or less aware that you make use of those truths. They refer to a comparatively wide range of topics, but on the other hand they seldom fill any very large place in our conscious thought, so long as we are dealing with the ordinary business of life. We presuppose such truths, without thinking much about them. On occasion we appeal to them. If anybody questions them, we repel the doubt, perhaps with indignation. When we discuss religious, or mathematical, or moral problems, we are often led to become aware of this or of that fundamental belief, at least, in passing. If anybody says that things could happen without any cause whatever, that for intance an eclipse or an earthquake is a mere matter of chance and has no

cause, we recall the universal principle, and consciously assert that without a cause nothing can happen. If anybody questions whether there is any fundamental difference between right and wrong, we again appeal to a funda ental belief to refute him. "That there is such a difference," we say, "is necessary, and the difference appears to us to be eternal." If anybody says that two straight lines can inclose a space, we do not ask him whether or no he has ever observed the fact. We appeal to necessity. We say, "That cannot be true. That is eternally impossible." Such is the place that fundamental ~~predictions~~ propositions play in the life of the intellect. We become aware of them if we are questioned; but then we maintain them as sometning necessary and inevitable. Furthermore, we use such beliefs in a conscious way whenever we make an effort to conceive the beginning of things, the creation of the world, or anything of that sort. And 20 1, if we wish to find out what the fundamental beliefs common to men are, we can find one of the best records in the beliefs that ha e been prevalent amongst both civilized and uncivilized men as to the crea ion of the world, as to the beginning of life, and as to the ultimate nature of things. Thus, there is very wide spread amongst all nations a collection of stories as to the origin of the universe. In all these stories the beginning of things is represented as a condition of darkness and of chaos, where night and water are the principle facts supposed to have been present. Out of this chaotic condition the present world is supposed to have sprung by means of some process which involves the coming of light, the appearance of some sharp division of the heavens above and the earth beneath, the equally sharp division of land and water, and the generation of living beings. All these processes are conceived as involving movements of matter, and the working of certain pervading and powerful causes , which may be viewed as a God

or as gods, or which are sometimes viewed as impersonal but still very potent physical principles at work. Now Three ideas, all of them fundamental, seem to be involved in all such stories of creation. The first is, That the world must have had an origin, which antedates the coming of man. The second is, That this origin must have depended upon some preëxistent real being, to be called water or night, or chaos, or in the Christian view, God himself, who made the world out of nothing. The third is, that the process of creation, must have involved the working of causes, whose powers can be defined in more or less necessary ter ms , so that, when they work, the world and the living creatures must neceassrily be produced. Now pretty much all the nations of men have had notions of this sort: North American Indians, Polynesians, Negroes in Africa, Hindus, or the Hebrews who gave us our own story of creation. None of these stories are mere reports of observed facts. They all relate to something declared to be real, but observed by no man. They are none of them mere comments upon the meanings of ideas, as if I should say, that two and two must make four, merely because that is what I mean by two and two. The stories of creation stand then for fundamental ideas in the human mind, ideas that have been believed to be necessary, and that have yet gone beyond anything that any man has ever experienced.

Now our present question is: How have men come by ~~these~~ such fundamental ideas? That the whole life of our intellect is more or less unconsciously determined by such ideas seems to be certain. On the other hand it is difficult to understand how such ideas could have come into our heads. This question will form the topic of the present lecture.

In answer to this question, two diffferent views have long been current amongst philosophical qriters. The one view, at one time extremely popular, uased to assert that the fundamnetal ideas, the source of all these necessary beliefs, were "innate" in the human mind, wer a part of its constitution, were created with it, and were intended by the Creator to reveal significant truth. The other view, which was maintained by Locke, and by other English thinkers, declared that the fundamental truths were due altogether to individual experience. Both of these views have difficulties in their way. As to the first, it seems to be perfectly certain, from all that we know of the mind, that nothing is innate in a human being, except certain organic tendencies, - tendencies which are extremely numerous, and which are such as to predetermine the way in which experience will affect us. But when these tendencies first influence our consciousness, when their effect first appears in our emotional and intellectual life, these tendencies show themselves not as innate ideas, but as factors whibh determine in one way or another what objects we shall find interesting, what activities shal delight us, what kinds of facts we shall find it easy to remember. But tendencies of this sort are innate only as the love of colors may be innate in an artistic mind, or the love of sounds in a musical mind. In advance of experience such interests do not mean any hereditary knowledge of colors or of sounds. They only mean what one might call organic adaptibility to such impressions. A child might inherit its temperament from a musical family. In so far it would have an innate aptitude to be attracted by music whenever it should come to hear music. But if through disease that child were to become deaf early in infancy, by reason of the injury of the external organ of hearing, the child would never show as deaf person any sign of possessing innate musical ideas . Now so far as we know, there is no sign direct or in-

direct that by heredity anybody's intellectual constitution is fatally predetermined to develop any ideas whatever, fundamental or insignificant. Leave the human being wholly untrained; and he will never develop rationality at all. Such cases as we know of untrained minds show in their extremer forms the truth that we inherit no rational ideas, and are not predetermined to become, apart from training, anything but idiots. As I have said, we inherit all sorts of aptitudes for training, just as we inherit eyes. But as the eye apart from light develops no innate perceptions, so the mind apart from training shows no signs of innate ideas.

But on the other hand, if our fundamental ideas are not innate we may well wonder how we come to be so sure as we are that they are true. For the assurance that such ideas are true, is not at all like our ordinary personal prejudices. It is an assurance that tends to grow clearer and more definite, the cooler and more rational men become, so long as they confine their thinking to a study of Natural Law. Herein the fundamental ideas above mentioned differ from our ordinary prejudices. That there exists a real world, a natural order independent of man, which existed before he existed, and which will survive his death; that this order is subject to the law of causation; that nothing happens therein except what somehow or other conforms to universal laws:—these are views of which, as we have seen, we find evidence in both savage and civilized belief. But these are also view s which become not dimmer but clearer in men's minds as civilization, as the critical sense, as clearer self-consciousness, advances and grow more careful. Many assurances of the savage fade out in civilized life. Many prejudices of individual men give way; but the belief in natural law, and in the existence of the physical world, grows clearer and stronger in men's

minds as time goes on. The savage believed that once upon a time the world was created. But his idea of past time did not go back very far and was essentially vague. The modern geologist has definite ideas about many millions of years of the world's past before man was created. The savage believes that something caused the present world to exist. The modern student of science has a belief in a great number of defined and rigid natural laws, whereby the causes of particular events are explained. Thus the belief in the so-called fundamental ideas, not merely survives the denial of numerous savage superstition and the laying aside of numerous prejudices that once seemed certain, but these beliefs in causation and in the external world actually grow clearer and stronger as man progresses. The individual himself, on the basis of his own experience comes to feel sure of numerous private prejudices; but these prove unstable. One belief arises, and passes away; and another takes its place. But those fundamental ideas remain steadfast except in so far as they grow clearer and surer. But how if they are not innate, can individuals come to feel such assurance of them ?

In recent times, Mr. Herbert Spencer is known to maintain still a third view with regard to these fundamental ideas,- a view different both from the traditional doctrine of the innate ideas, and from the thesis that the fundamental beliefs are derived from individual experience. Spencer has maintained that the fundamental beliefs are a sort of residuum left in us by what he supposes to be the experience of countless generations of our ancestors. Since all these generations have been dealing with a world in which uniform law prevails, Spencer reasons that in the long run the results of ancestral experience get fixed in the inherited organization of our nefvous system, so that we come

to believe that this is a real world full of natural law, a world where nothing happens uncaused, and to believe this because our ancestors ahve so long experienced facts of this sort. For the race, says Spencer, these beliefs are due to experience, for the individual they are hereditary assurances. But this belief of Spencer's is as much opposed to our present knowledge of Psychology, as was the old traditional doctrine of innate ideas. There is no evidence that the individual inherits the intellectual acquisitions of his ancesors. No child tends to speak the language of his ancestors, unless it is taught that language. No child tends to develop the habits of civilization without careful training. As before , we can say that ancestral traits, ancestral aptitudes, tendencies, predispositions, are very minutely inherited,- never so far as we know ancestral habits of an intellectual grade, or ancestral ideas. Spencer's somewhat famous compromise between experience and innate ideas may therefore be regarded as essentially a failure. We have not come by our fundamental ideas in Spencer's way.

It remains to see if any way can be found , beside the foregoing, of explaining why men have come to be so sure of the fundamental ideas. My own answer to this question has already been indicated. In every man I should say, the fundamental ideas come to seem so sure, partly because he has been taught them, as part of his intellectual training, and partly because he himself feels that if he were to take away the belief in these fundamental ideas, some of the essential conditions, upon which his whole social intercourse, and therewith his whole rational life, would depend, would be seriously endangered, or fundamentally altered. Feeling this, the individual man is likely to feel as sure ofthese fundamental ideas, as he is of the significance of his rationallife in general, because he feels that without these ideas his reason, which is bound up with the social order, is called in

question. Meanwhile, the society which has taught the individua these fundamental ideas has formend them, and has come to believe them, because of certain fundamental conditions under which our social consciousness, and where our power to communicate ideas to one another, has been originated, and has grown. In other words my own thesis is that if man could have become a rational being in solitude, he would not necessarily have his present set of fundamental ideas, that is he would not necessarily believe in the reality of the physical world, in the sense in which he now believes that world to be real. And he would not believe in the universal laws of physical causation, in the form in which he at pre ent holds that belief. My further thesis is that the fundamental ideas, as we at present possess them, are due to the conditions under which our social consciousness has been formed and transmitted.

This view will seem singular to some of you. It was for the sake of preparing the way for it, and of making it more acceptable, that I spent so much time in our previous lectures in indicating the social factors that so deeply modify our intellectual life. When I now come to reap the fruit of this preparation, and to display the human reason as a social product, and its whole equipment of fundamental truths, as an expression of certain deep, but still human social needs, I hope that we shall be not unwilling to view the intellect as thus socially determined, not only in its spirit, but in its deepest assurances. As we proceed to the examination of my thesis, I hope that you will bear in mind the far reaching considerations involved in our former discussions. It is a fact that man becomes rational in social surroundings, and in those alone. It is a fact that his whole self-consciousness is socially tinged, and has been socially developed. It is a fact that his thinking, is an expression of imitative tendencies which have been socially trained. As to the fundamental ideas, it is a fact that man

first hears them from his fellows, that they are not innate ideas, and that nothing in his own private experience is sufficient to war ant him in believeing, on his own responsibility wlone, in truth so far reaching, so world embracing, so thorough going. And yet it is a fact that every man does believe these truths, in one way or another, and that in so far as he becomes and remains a student of matter, he believes them more definitely, and more precisely, the more critical he becomes, thereby showing that the fundamental truths are at any rate not accidental or private prejeudices. Bear all these considerations in mind, and you may be prepared fro a social explanation of our acquistion even of these world embracing insights.

As I pointed out before, there is no opportunity in this discussion for attempting a complete list of those fundamental truths which were formerly regarded as innate ideas. It is here enough to point out that these truths in the main assert. (1) That we human beings live in a natural world which has an independent existence of its own, apart from our presence; (2) That this independent world antedates our own existence, and will survive any one of us; (3) That the facts of this world are subject to necessary laws of causation, so that given certain antecedents, certain results must follow (4) That the things of this world have some definite constitution, in so much that the changes which occur in the world are due to the changing relations amongst permanent things. Now of all these fundamental ideas about the world there is one common character to which I wish to call your attention. This common character is that all the fundamental ideas imply that the facts ot the world are in some way independent of human caprice, of private wishes, of private opinions, and of the changes and uncertainties of our passing feelings. "The things of the natural world are permanent." That means, when practically applied, that these things re-

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main whatever they are, however much your feelings or mine may alter, however much your opinions or mine may shift, however widely your accounts or mine may differ. The permanent things thus stand over against our shifting sentiments, wishes, theories, opinions; like an eternal Ought standing over against the caprices of individual will. They demand that we should conform to them, They are not there to conform to us. Such I insist is the practical bearing of our belief in the permanence of the external world. Just so when the events of the world are conceived as conforming to permanent laws. These laws are now viewed as independent of our caprices, and of our reports. Both the permanent things, and the permanent laws demand of us then exact and precise accounts. Our dreams are inexact, We can narrate them as we will. Our waking life may be inexact too. It is inexact in so far as it is a life of sentiment and changing fancy. But our waking life, in so far as it refers to natural truth, is bound to view its facts as conforming to law, and as embodying permanent types of reality; in other words on so far as we wish to deal with natural truth we must give exact accounts of things and events. Thus upon one side, the fundamental ideas may be summed up, by saying that they all alike require us to view the world as exact, precisely in so far as these fundamental ideas refer to natural facts in the real external world. A similar comment might be made upon certain fundamental ideas which I have not included in the foregoing account. but which are equally fundamental with the ideas of natural truth. These are the fundamental ideas about the moral world. They are equally the ideas of some permanent Ought which is conceived as binding upon individual caprice, so that rectitude of conduct implies exactitude of conduct, comformity to rule, expression of permanent principles in the acts of life. These moral principles are conceiv- as existent before the individual, and as outlasting every individual

man. The moral law and the stars, which Kant in his famous saying puts side by side agree in being permanet, and independent of private opinion and caprice. Both are also conceived as exact in their nature, and in the principles which they express. And now such exactitude, both of the natural and the moral world is precisely what the fundamental ideas unite in regarding as of valid truth. To ask the origin of these fundamental ideas is then, for our present purpose, to ask the origin of the conception of the Exactitude of the World of Truth. How came the human mind by this conception. How came man to say: My universe must be conceived by me as something conforming to exact law, embodying precise rules independent of my caprice, or of any man's caprice?

When we reduce the question about the fundamental ideas to this question about the origin of the coception of Exactitude, we indicate at once in what direction we have to look for such an origin. Man could never conceive the world as exact, or truth as subject to precise law, until he himself had formed the conception of exactness by means of the performance of consciously exact actions, the idea of law, of precise rule, by means of the performance of acts which were consciously in accordance with precise rules. Now under what circumstances does man learn to be consciously orderly, precise, or exact, in any of his conduct. I answer, under social conditions. In his inherited organism man has countless activities predetermined which in themselves considered i involve precise relations of one set of acts to other sets of acts. In this sense man's muscular coordinations, quite apart from the social training, have a great deal of exactness about them. The hand can follow the eye, when we look at an object and then grasp it, and in such cases, as in all acts of walking, balancing, handling

objects, finding lost objects and so on, countless very precise co-ordinations of very numerous muscular acts take place. But such exactness is in general not only untrained, but unconscious. As the cat does not know how she balances in walking along the thin edge of a plank, as a snake can run up an inclined branch, balancing the constantly changing curves of its body on the two sides of the branch and hissing at you as it does so, but without knowing how this delicate athletic feat is accomplished, so a man inherits, and trains vast numbers of coordinations which are in themselves exact, but which he does n t know as such. On the other hand ask an untrained man, or what is more commonly done, ask an untrained child to acquire any form of conscious exactness, such as to orderly, to be punctual, to keep engagements, to measure and weigh things exactly, or in the simpler cases, to make precisely the movement that you wish him to make, and the acquisition of the new art is attended, usually with a considerable difficulty, and always, I suppose, with a consciousness of the new kind of exactness, at the time when it is acquired. Such cases illustrate the difference between unconscious exactness of conduct, and conscious conformity to rule. The child who can climb and balance with such easy agility, not knowing how he does all this, or hardly knowing, is utterly unable, for a good while to acquire orderly habits, or to be exact in a way which you demand of him, and which he therefore makes a matter of consciousness when he acquires these habits and this exact way.

If once you draw this difference between conscious and unconscious exactitude of action, you will see that while the child, like the animal, is extremely conservative in his habits, he learns to be aware of the exactness of his habits by virtue of his social relations only. The child is a pedant in his own world, but still in his social world. You must tell his the same story in the same way; you must do

the same thing under the same circumstances. In this way the child demands of you exactness. In demanding this of you he may and often does become gradually aware both of the nature of his own habits, and of the meaning of exactness. But in the child world as in the larger social world, it is man that requires man to be exact, and to learn the conscious conformity to rule. Civilization depends upon time keepers and regular appointments made according to these time keepers. But what individual man, left to himself, would ever acquire, consciously exact ideas o the flight of time, such as men have forced one another to acquire. Whst child ever gets an idea of putting things in their places until that some one has taught him that things have their places or ought to have. What office boy acquires the sort of exactness that lies at the basis of business habits, until somebody has taught him such exactness. He may be enthusiastic about trying to succeed in business, but it is social training that alone can give him conscious order in his behavior. Any one will observe the facts then will soon see that there is some very deep difference between the unconscious exactness of coordination and orderliness of habit which distinguishes the unconsciously conservative animal or child on the one hand, and the conscious exactness which distinguishes the civilized man in society on the other hand. The hens and cows are conservative; they like to go out and return at the same hours, or at least in the same part of the daylight, everyday. The children rejoice in habit, and fret at a disturbed routine, long before they are rational. Yet between that sort of conservatism, and the punctuality of the man of business, who is always in his office at fixed times, there lies somehow that vast region of chaotic childhood and youth, where no child is orderly, unless he learns by imitation or by discipline, where the untrained youth is

liable to be unpunctual, vague, shiftless, and averse to e actness. We often wonder why this vast gap must exist. When the babies love routine so heartily, why are the older children so disorderly. The answer is that conscious exactness and good order, the intention to be precise, punctual and the rest, are processes wholly different from those involved in the unconscious orderliness of our early habits. The highest centres of the brain are trained in social life; and that is why man needs so large a brain. Until these higher centres are trained conscious exactness is impossible. The ordinary routine of life is insufficient of itself to train these vast and complex centres. And until trained they give us no idea of order.

On the other hand, the reason why men who are to live in social relations must train conscious exactness, is perfectly plain. A number of men are to meet in order to talk over a matter of buseiness. There must be some way of agreeing as to when the shall meet. In early stages of civilization, in the absence of artificial timekeepers, they would still seek for natural timekeepers to determine their agreement as to their time of meeting. They would agree to meet at sun-rise, or at high noon. or at sunset If a day were needed for the purpose, they would choose the new moon or some other such definite time. In this way they would come to need a calendar, however rough, and most savage nations have some sort of calender. The determination of time is one of the most fruitful sources of the conscious consption of exactness. In order to determine time, man was led to take account of whatever natural fact, the object of common observation and report, would serve to determine time agreements. To fix in this way upon the facts of the calendar, early implied for men, the belief in some sort of natural law. The law of the time keepers, was probably the first observed law of nature which had

a really exact character, a really mathematical definiteness. Yet the observation of such laws depended entirely upon obvious social motives. Time agreements had to be obtained for social purposes; sicne man had to require man to be more or less punctual, in order that common actions should be entered upon. Yet time-keeping was the beginning and the source of astronomical science and historical exactness and a word order

Or again one man desires another man to do something for him, or still more, he still more he desires several men to do something for him all at once. Let these men be his servants or his soldiers or whatever other obedient persons you please. What a man wants for himself he may feel as vaguely as you like. What he wants another man to do for him, he must explain, somewhat definitely. Otherwise he will not know himself whether his command is carried out. Moreover his servants, especially if numerous, will not know how to cooperate to meet his wishes. Hence, if a number of men are working under some chief, a certain exactness, and a conscious exactenss of behavior must be developed, or nothing will happen. In consequence, whenever many men work together, under Orders, there must be custom, there must be ways of standing, of getting marshalled in rank, or of moving in other definite groups, there must be a more or less ceremonial precision of behavior about what is done. Again, if several people are in a council, it is useless for all to speak at once. In that case nobody would be heard. The consequence will be that councils, even, or one might say especially among savage tribes, will be governed by rules of order, which may involve very elaborate etiquette. Such etiquette, once come to consciousness may get elaborated in various ways. There may be an order in which given men must speak,- perhaps the youngest last, perhaps on the other hand the person of most dignity last of all. Both customs exist, and among savage peoples too. Perhaps the way in which one speak-

er refers to others will be predetermined by rule, for the sake of avoiding capricious quarrels. So it is in our own deliberative bodies. A still more definite etiquette in some Indian tribes, demanded that each speaker in a council should first repeat from memory all that his predecessors had said, and then only should proceed to state his own views. All such etiquette means exactness of conduct, required for the sake of some sort of social cooperation, because if each man does what he likes, no cooperation can result, while if you are going to limit a man, you must give a more or less exact rule to define his limitations. But such exactness, taught by man to man, gives the conception of exactness as a social ideal, when once acquired, can be used as a basis for conceiving what a world of truth, independent of my personal caprice, ought to be and is, whether viewed as a natural or as a moral world.

In an entirely different direction we can follow the origin of exactness in social relations, when we consider commrcial relations. A man enters into commercial relations, becauses he wishes to get some thi g that another man possesses, and because the rules of commercial life provide the means. Now if commercial relations were limited to barter, and to direct contact between buyer and seller, little exactness would be required. In barter A shows B what he wants, and wha he will give for it, and B accepts or rejects the offer. But suppose the commercial relations are indirect. Suppose they involve dealing in goods not yet delivered, or not yet in sight. Suppose the element of con ract, of agreement to do something for something eneters into the transaction. Then the unseen or undeveloped goods must be described, and valued, the contract whose execution extends over some time, must be defined, and there must be some means of agreeing in the long run as to what equals what, and as to what delivery fulfills a given promise. Differences will arise, and will lead to conflict. Conflicts must be settled in the long run by further agreements, or by the intervention of third parties. Now every such agreement whether it is a primary contract, or the reconciliation after the dispute, or the result of an intervention of

third parties such as judges, must demand, and does demand an exactness of definition, which begins already in savage life as soon as trade appears, and which grows more elaborate and exact as long as civilization continues. Now it is this sort of exactness which has taught men in all ages to weigh and to measure, i n other words to begin the work of exact science. And precisely as the natural time-keepers were sought out and observed, and their laws noted for the sake of making social agreements as to punctuality in meeting for all kinds of business, so the equally social acquirements to weigh and measure for the sake of accomplishing commercial business, first taught, and still teaches men how to discover on the realm of physics, natural phenomena which admit of precise measurement. Physical science, in the stricter sense began when men learned to use balances. The theory of the scale was the foundation for the Greek geometer Archimedes, of the science of mechanics. Within our own generation the precies measurement of electrical energy has become fequisite for commercial purposes. Considerable advances in the scientific knowledge of ~~electricity~~ (the quantitative laws of) have been due to the necessity of meeting the various stages of the development of this commecial need. Thus, in all stages of science, the social need of exact and quantitative agreement about commercially important matters has led men to look, amongst natural processes, for phenomena capable of exact description, subject to rigid law, and suitable for meeting the social need for exact definition of commercially valuable objects. The point here is, not that exactly definable natural objects happen to be commercially valuable, although this is often the case. What interests us here is that man for commercial purposes, for the sake of reaching an agreement about purchase, sale and contract, first requires man to be exact, that man thus required to be exact, looks in natural phenomena

for means of measurement; and that when he finds such means, he not only by chance discovers laws of nature, but also discovers a reason why he has to view such laws as valid for all objects of that particular kind of commercial interest. For the process upon which man here enters works as it were both ways. It first affects his view of his own life, by defining for him contracts which he otherwise could not make at all. For unless he could weigh and measure in this exact way, he could not make such elaborate contracts, he could not develop such abstract ideas, he could not enter upon such elaborate social business. On the other hand, man comes to conceive that the natural objects which enable him thus to define his contracts, have a peculiar reality, a peculiar independence of his caprices, a peculiar definiteness of nature which now exalts them in grade of merely physical reality, above aother natural objects. The things that you can measure and weigh come to be conceived as peculiarly exemplary parts of the real world, so that one gradually gets the idea that natural objects are real, are independent of us, and are existent apart from our wishes, just in proportion as they are exact, definable, measurable. In terms of this standard man henceforth conceives reality, so that in the end, after a long process of this discipline, he at last today believes it a priori necessary that real natural objects, in so far as they are real, should be subject to quantitatively exact laws. The vague fegions of our experience, where you cannot weigh and measure, where exact definition, and the rigidity originally demanded of commercial contracts, cannot be realized, come thus to be regarded as parts of narure which we do not well understand, which we csnnot yet weigh and measure, or as relatively unreal and intangible phenomena, the product of illusion. Thus at all events, we may conceive at last one very noteworthy origin for our belief that the natural world is one of law. When you rememb-

er that land ownership was one source of geometrical science, that arithmetic and physics first directly grew out of commercial relations, and that today the intimate connection between the physically and chemically definable, and the commercially exact and estimable commodities still persists, and constantly grows in extent, you may see the plausibility of such a theory of the social origin of our conception of the world of natural law. Remember that the savages are already traders , and that we trade the more the more civilized we are; and you may appreciate the depth of this commercial motive. Once more then, man has taught man to be exact, and the idea of exactness, thus attained, has been used to define natural laws, and to form a basis for defining a world of truth, independent of private caprice.

But commerce was not the only source of the social interests in the exact definition of the things and laws of nature Another source is industrial art, whose relations to fine art are known to be very profoundly manifold. An industrial art involves using objects of nature, of whose properties one takes advantage for the sake of producing something that meets a need. But this need is never an individual need only, It is a social need. The industrial artist, the Indian basket maker, the potter, the carver of tools and weapons, is working not alone to meet individual needs or to satisfy private caprices. The savage man or woman who makes baskets, pottery, tools, or weapons is working according to socially defined ideals, follows exact rules, learns the art by tradition, teaches it to a younger generation, is proud of his or her skill, overcomes rivals, in brief meets social requirements. These requirements leave indeed some room for individual fancy, but they limit his fancy according to tribal rules. Particular sorts of decoration are demanded. The primitive art tends to elaborate symbolism, and to very highly conventional designs. It often bears the marks of being a very highly constrained art. It does not show the free

constructiveness characteristic of a more civilized art. But wherein lies the source of this constraint of primitive art? I answer that the prominence of the conventional or social motives as the source of this constraint seems to be recognized by students of primitive art whose leading I, as one altogether a layman in this particular field, am forced to follow. [Read from Ratzel, I, p. 71 marked passages, & 2pp. to p. 74]

The lesson of such considerations

seems to be the principle that in his
art, even when this art is devoted to
imitating objects, primitive man is even
more concerned to imitate social
conventions, than to imitate objects.
The social conventions may be religious
or non-religious. The result is in fact
the same. The conventions restrain
the artist. They force limits to do not
what he wills, but what custom
ordains. But herein lies the source

of a very momentous result. Man thus learns conscious exactness, conscious accordance with rule. But this conscious accordance with rule is now, in a constructive art, inseparably bound up with a knowledge of the properties of physical things; for the art uses its materials, its clay, its material for weaving, or carving, or basket work. The exact conventions of the art have to be related to the physical properties of these materials. In order to become consciously exact in his behaviour, man here

has to become conscious of these physical properties of his materials. And now the result: Man, who, left to his individual whim, would never have learned to be conscious that nature has any exact laws at all, — man as artist has unconsciously to learn laws of physical nature in order to be able to conform to these rigid social conventions of his art. He has to regard the materials of his art as subject to rigid laws, and as knowing exact

physical properties, (— he has to find this out, I say,) in order to be able to conform to acid conventions, and to exhibit his proud skill as an artist. Here again, as you see, it is under the yoke of convention that man learns the conception of natural law.

Time would fail me to give any extensive illustrations drawn from this branch of the history of the growth of the human intellect. All the arts would illustrate, and especially in their earlier phases, this influence

conventions upon the study of physics. The elaborate study of the physical properties of clay which the Indian women of the Pueblo villages made, in the elaboration of their pottery, has recently been used as the topic of a very charming chapter by Mr. Otis Mason, in his instructive book called "Woman's Share in Primitive Culture." Here you see how the Pueblo housewife and artist, engaged in the strictly social business of supplying the home wants, of conforming to old customs, and of

displaying her skill, was forced to become
an elaborate student of the physics of
clay. She selected materials, prepared them
by skillful processes, modeled them upon
plans formed through the imitation of
the still older art of basket making, worked
without potter's wheel, but produced
highly elaborated forms of pottery,
and ornamented them with designs
that grew, with time, more and more
elaborate, conventional, and symbolic.
Here is great and conscious skill. It is
formed upon social bases. It involves

the notion that nature contains things that have exact properties. The social and the physical become thus linked by inseparable ties. The exactness of social convention gets matched by the exactness of the physical conceptions. So it is in case of any industrial art.

But now, as we have seen the natural sciences have grown out of the industrial arts. There are stages of culture where the blending of the

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