CHAPTER 1

Nature and thought

The subject-matter of the Tarner lectures is defined by the founder to be 'the Philosophy of the Sciences and the Relations or Want of Relations between the different Departments of Knowledge.' It is fitting at the first lecture of this new foundation to dwell for a few moments on the intentions of the donor as expressed in this definition; and I do so the more willingly as I shall thereby be enabled to introduce the topics to which the present course is to be devoted.

We are justified, I think, in taking the second clause of the definition as in part explanatory of the earlier clause. What is the philosophy of the sciences? It is not a bad answer to say that it is the study of the relations between the different departments of knowledge. Then with admirable solicitude for the freedom of learning there is inserted in the definition after the word 'relations' the phrase 'or want of relations.' A disproof of relations between sciences would in itself constitute a philosophy of the sciences. But we could not dispense either with the earlier or the later clause. It is not every relation between sciences which enters into their philosophy. For example biology and physics are connected by the use of the microscope. Still, I may safely assert that a technical description of the uses of the microscope in biology is not part of the philosophy of the sciences. Again, you cannot abandon the later clause of the definition; namely that referring to the relations between the sciences, without abandoning the explicit reference to an ideal in the absence of which philosophy must languish from lack of intrinsic interest. That ideal is the attainment of some unifying concept which will set in assigned relationships within itself all that there is for knowledge, for feeling, and for emotion. That far off ideal is the motive power of philosophic research; and claims allegiance even as you expel it. The philosophic pluralist is a strict logician; the Hegelian thrives on contradictions by the help of his absolute; the Mohammedan divine bows before the creative will of Allah; and the pragmatist will swallow anything so long as it 'works.'

The mention of these vast systems and of the age-long controversies from which they spring, warns us to concentrate. Our task is the simpler one of the philosophy of the sciences. Now a science has already a certain unity which is the very reason why that body of knowledge has been instinctively recognised as forming a science. The philosophy of a science is the endeavour to express explicitly those unifying characteristics which pervade that complex of thoughts and make it to be a science. The philosophy of the sciences—conceived as one subject—is the endeavour to exhibit all sciences as one science, or—in case of defeat—the disproof of such a possibility.

Again I will make a further simplification, and confine attention to the natural sciences, that is, to the sciences whose subject-matter is nature. By postulating a common subject-matter for this group of sciences a unifying philosophy of natural science has been thereby presupposed.

What do we mean by nature? We have to discuss the philosophy of natural science. Natural science is the science of nature. But—What is nature?

Nature is that which we observe in perception through the senses. In this sense-perception we are aware of something which is not thought and which is self-contained for thought. This property of being self-contained for thought lies at the base of natural science. It means that nature can be thought of as a closed system whose mutual relations do not require the expression of the fact that they are thought about.

Thus in a sense nature is independent of thought. By this statement no metaphysical pronouncement is intended. What I mean is that we can think about nature without thinking about thought. I shall say that then we are thinking 'homogeneously' about nature.

Of course it is possible to think of nature in conjunction with thought about the fact that nature is thought about. In such a case I shall say that we are thinking 'heterogeneously' about nature. In fact during the last few minutes we have been thinking heterogeneously about nature. Natural science is exclusively concerned with homogeneous thoughts about nature.

But sense-perception has in it an element which is not thought. It is a difficult psychological question whether sense-perception involves thought; and if it does involve thought, what is the kind of thought which it necessarily involves. Note that it has been stated above that sense-perception is an awareness of something which is not thought. Namely, nature is not thought. But this is a different question, namely that the fact of sense-perception has a factor which is not thought. I call this factor

'sense-awareness.' Accordingly the doctrine that natural science is exclusively concerned with homogeneous thoughts about nature does not immediately carry with it the conclusion that natural science is not concerned with sense-awareness.

However, I do assert this further statement; namely, that though natural science is concerned with nature which is the terminus of sense-perception, it is not concerned with the sense-awareness itself.

I repeat the main line of this argument, and expand it in certain directions.

Thought about nature is different from the sense-perception of nature. Hence the fact of sense-perception has an ingredient or factor which is not thought. I call this ingredient sense-awareness. It is indifferent to my argument whether sense-perception has or has not thought as another ingredient. If sense-perception does not involve thought, then sense-awareness and sense-perception are identical. But the something perceived is perceived as an entity which is the terminus of the sense-awareness, something which for thought is beyond the fact of that sense-awareness. Also the something perceived certainly does not contain other sense-awarenesses which are different from the sense-awareness which is an ingredient in that perception. Accordingly nature as disclosed in sense-perception is self-contained as against sense-awareness, in addition to being self-contained as against thought. I will also express this self-containedness of nature by saying that nature is closed to mind.

This closure of nature does not carry with it any metaphysical doctrine of the disjunction of nature and mind. It means that in sense-perception nature is disclosed as a complex of entities whose mutual relations are expressible in thought without reference to mind, that is, without reference either to sense-awareness or to thought. Furthermore, I do not wish to be understood as implying that sense-awareness and thought are the only activities which are to be ascribed to mind. Also I am not denying that there are relations of natural entities to mind or minds other than being the termini of the sense-awarenesses of minds. Accordingly I will extend the meaning of the terms 'homogeneous thoughts' and 'heterogeneous thoughts' which have already been introduced. We are thinking 'homogeneously' about nature when we are thinking about it without thinking about thought or about sense-awareness, and we are thinking 'heterogeneously' about nature when we are thinking about it in conjunction with thinking either about thought or about sense-awareness or about both.

I also take the homogeneity of thought about nature as excluding any reference to moral or aesthetic values whose apprehension is vivid in proportion to self-conscious activity. The values of nature are perhaps the key to the metaphysical synthesis of existence. But such a synthesis is exactly what I am not attempting. I am concerned exclusively with the generalisations of widest scope which can be effected respecting that which is known to us as the direct deliverance of sense-awareness.

I have said that nature is disclosed in sense-perception as a complex of entities. It is worth considering what we mean by an entity in this connexion. 'Entity' is simply the Latin equivalent for 'thing' unless some arbitrary distinction is drawn between the words for technical purposes. All thought has to be about things. We can gain some idea of this necessity of things for thought by examination of the structure of a proposition.

Let us suppose that a proposition is being communicated by an expositor to a recipient. Such a proposition is composed of phrases; some of these phrases may be demonstrative and others may be descriptive.

By a demonstrative phrase I mean a phrase which makes the recipient aware of an entity in a way which is independent of the particular demonstrative phrase. You will understand that I am here using 'demonstration' in the non-logical sense, namely in the sense in which a lecturer demonstrates by the aid of a frog and a microscope the circulation of the blood for an elementary class of medical students. I will call such demonstration 'speculative' demonstration, remembering Hamlet's use of the word 'speculation' when he says,

> There is no speculation in those eyes.

Thus a demonstrative phrase demonstrates an entity speculatively. It may happen that the expositor has meant some other entity—namely, the phrase demonstrates to him an entity which is diverse from the entity which it demonstrates to the recipient. In that case there is confusion; for there are two diverse propositions, namely the proposition for the expositor and the proposition for the recipient. I put this possibility aside as irrelevant for our discussion, though in practice it may be difficult for two persons to concur in the consideration of exactly the same proposition, or even for one person to have determined exactly the proposition which he is considering.

Again the demonstrative phrase may fail to demonstrate any entity. In that case there is no proposition for the recipient. I think that we may assume (perhaps rashly) that the expositor knows what he means.

A demonstrative phrase is a gesture. It is not itself a constituent of the proposition, but the entity which it demonstrates is such a constituent. You may quarrel with a demonstrative phrase as in some way obnoxious to you; but if it demonstrates the right entity, the proposition is unaffected though your taste may be offended. This suggestiveness of the phraseology is part of the literary quality of the sentence which conveys the proposition. This is because a sentence directly conveys one proposition, while in its phraseology it suggests a penumbra of other propositions charged with emotional value. We are now talking of the one proposition directly conveyed in any phraseology.

This doctrine is obscured by the fact that in most cases what is in form a mere part of the demonstrative gesture is in fact a part of the proposition which it is desired directly to convey. In such a case we will call the phraseology of the proposition elliptical. In ordinary intercourse the phraseology of nearly all propositions is elliptical.

Let us take some examples. Suppose that the expositor is in London, say in Regent's Park and in Bedford College, the great women's college which is situated in that park. He is speaking in the college hall and he says,

'This college building is commodious.'

The phrase 'this college building' is a demonstrative phrase. Now suppose the recipient answers,

'This is not a college building, it is the lion-house in the Zoo.'

Then, provided that the expositor's original proposition has not been couched in elliptical phraseology, the expositor sticks to his original proposition when he replies,

'Anyhow, *it* is commodious.'

Note that the recipient's answer accepts the speculative demonstration of the phrase 'This college building.' He does not say, 'What do you mean?' He accepts the phrase as demonstrating an entity, but declares that same entity to be the lion-house in the Zoo. In his reply, the expositor in his turn recognises the success of his original gesture as a speculative demonstration, and waives the question of the suitability of its mode of suggestiveness with an 'anyhow.' But he is now in a position to repeat the original proposition with the aid of a demonstrative gesture robbed of any suggestiveness, suitable or unsuitable, by saying,

'*It* is commodious.'

The *'it'* of this final statement presupposes that thought has seized on the entity as a bare objective for consideration.

We confine ourselves to entities disclosed in sense-awareness. The entity is so disclosed as a relatum in the complex which is nature.

It dawns on an observer because of its relations; but it is an objective for thought in its own bare individuality. Thought cannot proceed otherwise; namely, it cannot proceed without the ideal bare 'it' which is speculatively demonstrated. This setting up of the entity as a bare objective does not ascribe to it an existence apart from the complex in which it has been found by sense-perception. The 'it' for thought is essentially a relatum for sense-awareness.

The chances are that the dialogue as to the college building takes another form. Whatever the expositor originally meant, he almost certainly now takes his former statement as couched in elliptical phraseology, and assumes that he was meaning,

'This is a college building and is commodious.'

Here the demonstrative phrase or the gesture, which demonstrates the 'it' which is commodious, has now been reduced to 'this'; and the attenuated phrase, under the circumstances in which it is uttered, is sufficient for the purpose of correct demonstration. This brings out the point that the verbal form is never the whole phraseology of the proposition; this phraseology also includes the general circumstances of its production. Thus the aim of a demonstrative phrase is to exhibit a definite 'it' as a bare objective for thought; but the *modus operandi* of a demonstrative phrase is to produce an awareness of the entity as a particular relatum in an auxiliary complex, chosen merely for the sake of the speculative demonstration and irrelevant to the proposition. For example, in the above dialogue, colleges and buildings, as related to the 'it' speculatively demonstrated by the phrase 'this college building,' set that 'it' in an auxiliary complex which is irrelevant to the proposition

'It is commodious.'

Of course in language every phrase is invariably highly elliptical. Accordingly the sentence

'This college building is commodious'

means probably

'This college building is commodious as a college building.'

But it will be found that in the above discussion we can replace 'commodious' by 'commodious as a college building' without altering our conclusion; though we can guess that the recipient, who thought he was in the lion-house of the Zoo, would be less likely to assent to

'Anyhow, it is commodious as a college building.'

A more obvious instance of elliptical phraseology arises if the expositor should address the recipient with the remark,

'That criminal is your friend.'

The recipient might answer,

'He is my friend and you are insulting.'

Here the recipient assumes that the phrase 'That criminal' is elliptical and not merely demonstrative. In fact, pure demonstration is impossible though it is the ideal of thought. This practical impossibility of pure demonstration is a difficulty which arises in the communication of thought and in the retention of thought. Namely, a proposition about a particular factor in nature can neither be expressed to others nor retained for repeated consideration without the aid of auxiliary complexes which are irrelevant to it.

I now pass to descriptive phrases. The expositor says,

'A college in Regent's Park is commodious.'

The recipient knows Regent's Park well. The phrase 'A college in Regent's Park' is descriptive for him. If its phraseology is not elliptical, which in ordinary life it certainly will be in some way or other, this proposition simply means,

'There is an entity which is a college building in Regent's Park and is commodious.'

If the recipient rejoins,

'The lion-house in the Zoo is the only commodious building in Regent's Park,'

he now contradicts the expositor, on the assumption that a lion-house in a Zoo is not a college building.

Thus whereas in the first dialogue the recipient merely quarrelled with the expositor without contradicting him, in this dialogue he contradicts him. Thus a descriptive phrase is part of the proposition which it helps to express, whereas a demonstrative phrase is not part of the proposition which it helps to express.

Again the expositor might be standing in Green Park—where there are no college buildings—and say,

'This college building is commodious.'

Probably no proposition will be received by the recipient because the demonstrative phrase,

'This college building'

has failed to demonstrate owing to the absence of the background of sense-awareness which it presupposes.

But if the expositor had said,

'A college building in Green Park is commodious,'

the recipient would have received a proposition, but a false one.

Language is usually ambiguous and it is rash to make general assertions as to its meanings. But phrases which commence with 'this'

or 'that' are usually demonstrative, whereas phrases which commence with 'the' or 'a' are often descriptive. In studying the theory of propositional expression it is important to remember the wide difference between the analogous modest words 'this' and 'that' on the one hand and 'a' and 'the' on the other hand. The sentence

'The college building in Regent's Park is commodious'

means, according to the analysis first made by Bertrand Russell, the proposition,

'There is an entity which (i) is a college building in Regent's Park and (ii) is commodious and (iii) is such that any college building in Regent's Park is identical with it.'

The descriptive character of the phrase 'The college building in Regent's Park' is thus evident. Also the proposition is denied by the denial of any one of its three component clauses or by the denial of any combination of the component clauses. If we had substituted 'Green Park' for 'Regent's Park' a false proposition would have resulted. Also the erection of a second college in Regent's Park would make the proposition false, though in ordinary life common sense would politely treat it as merely ambiguous.

'The Iliad' for a classical scholar is usually a demonstrative phrase; for it demonstrates to him a well-known poem. But for the majority of mankind the phrase is descriptive, namely, it is synonymous with 'The poem named "the Iliad".'

Names may be either demonstrative or descriptive phrases. For example 'Homer' is for us a descriptive phrase, namely, the word with some slight difference in suggestiveness means 'The man who wrote the Iliad.'

This discussion illustrates that thought places before itself bare objectives, entities as we call them, which the thinking clothes by expressing their mutual relations. Sense-awareness discloses fact with factors which are the entities for thought. The separate distinction of an entity in thought is not a metaphysical assertion, but a method of procedure necessary for the finite expression of individual propositions. Apart from entities there could be no finite truths; they are the means by which the infinitude of irrelevance is kept out of thought.

To sum up: the termini for thought are entities, primarily with bare individuality, secondarily with properties and relations ascribed to them in the procedure of thought; the termini for sense-awareness are factors in the fact of nature, primarily relata and only secondarily discriminated as distinct individualities.

No characteristic of nature which is immediately posited for knowledge by sense-awareness can be explained. It is impenetrable by thought, in the sense that its peculiar essential character which enters into experience by sense-awareness is for thought merely the guardian of its individuality as a bare entity. Thus for thought 'red' is merely a definite entity, though for awareness 'red' has the content of its individuality. The transition from the 'red' of awareness to the 'red' of thought is accompanied by a definite loss of content, namely by the transition from the factor 'red 'to the entity 'red.' This loss in the transition to thought is compensated by the fact that thought is communicable whereas sense-awareness is incommunicable.

Thus there are three components in our knowledge of nature, namely, fact, factors, and entities. Fact is the undifferentiated terminus of sense-awareness; factors are termini of sense-awareness, differentiated as elements of fact; entities are factors in their function as the termini of thought. The entities thus spoken of are natural entities. Thought is wider than nature, so that there are entities for thought which are not natural entities.

When we speak of nature as a complex of related entities, the 'complex' is fact as an entity for thought, to whose bare individuality is ascribed the property of embracing in its complexity the natural entities. It is our business to analyse this conception and in the course of the analysis space and time should appear. Evidently the relations holding between natural entities are themselves natural entities, namely they are also factors of fact, there for sense-awareness. Accordingly the structure of the natural complex can never be completed in thought, just as the factors of fact can never be exhausted in sense-awareness. Unexhaustiveness is an essential character of our knowledge of nature. Also nature does not exhaust the matter for thought, namely there are thoughts which would not occur in any homogeneous thinking about nature.

The question as to whether sense-perception involves thought is largely verbal. If sense-perception involves a cognition of individuality abstracted from the actual position of the entity as a factor in fact, then it undoubtedly does involve thought. But if it is conceived as sense-awareness of a factor in fact competent to evoke emotion and purposeful action without further cognition, then it does not involve thought. In such a case the terminus of the sense-awareness is something for mind, but nothing for thought. The sense-perception of some lower forms of life may be conjectured to approximate to this character habitually. Also occasionally our own

sense-perception in moments when thought-activity has been lulled to quiescence is not far off the attainment of this ideal limit.

The process of discrimination in sense-awareness has two distinct sides. There is the discrimination of fact into parts, and the discrimination of any part of fact as exhibiting relations to entities which are not parts of fact though they are ingredients in it. Namely the immediate fact for awareness is the whole occurrence of nature. It is nature as an event present for sense-awareness, and essentially passing. There is no holding nature still and looking at it. We cannot redouble our efforts to improve our knowledge of the terminus of our present sense-awareness; it is our subsequent opportunity in subsequent sense-awareness which gains the benefit of our good resolution. Thus the ultimate fact for sense-awareness is an event. This whole event is discriminated by us into partial events. We are aware of an event which is our bodily life, of an event which is the course of nature within this room, and of a vaguely perceived aggregate of other partial events. This is the discrimination in sense-awareness of fact into parts.

I shall use the term 'part' in the arbitrarily limited sense of an event which is part of the whole fact disclosed in awareness.

Sense-awareness also yields to us other factors in nature which are not events. For example, sky-blue is seen as situated in a certain event. This relation of situation requires further discussion which is postponed to a later lecture. My present point is that sky-blue is found in nature with a definite implication in events, but is not an event itself. Accordingly in addition to events, there are other factors in nature directly disclosed to us in sense-awareness. The conception in thought of all the factors in nature as distinct entities with definite natural relations is what I have in another place[1] called the 'diversification of nature.'

There is one general conclusion to be drawn from the foregoing discussion. It is that the first task of a philosophy of science should be some general classification of the entities disclosed to us in sense-perception.

Among the examples of entities in addition to 'events' which we have used for the purpose of illustration are the buildings of Bedford College, Homer, and sky-blue. Evidently these are very different sorts of things; and it is likely that statements which are made about one kind of entity will not be true about other kinds. If human thought

1 Cf. *Enquiry*.