

PART III.--OF INFERENCES.
CHAPTER I.

Of Inferences in General.

Section 426. To infer is to arrive at some truth, not by direct experience, but as a consequence of some truth or truths already known. If we see a charred circle on the grass, we infer that somebody has been lighting a fire there, though we have not seen anyone do it. This conclusion is arrived at in consequence of our previous experience of the effects of fire.

Section 427. The term Inference is used both for a process and for a product of thought.

As a process inference may be defined as the passage of the mind from one or more propositions to another.

As a product of thought inference may be loosely declared to be the result of comparing propositions.

Section 428. Every inference consists of two parts--

- (1) the truth or truths already known;
- (2) the truth which we arrive at therefrom.

The former is called the Antecedent, the latter the Consequent. But this use of the terms 'antecedent' and 'consequent' must be carefully distinguished from the use to which they were put previously, to denote the two parts of a complex proposition.

Section 429. Strictly speaking, the term inference, as applied to a product of thought, includes both the antecedent and consequent: but it is often used for the consequent to the exclusion of the antecedent. Thus, when we have stated our premisses, we say quite naturally, 'And the inference I draw is so and so.'

Section 430. Inferences are either Inductive or Deductive. In induction we proceed from the less to the more general; in deduction from the more to the less general, or, at all events, to a truth of not greater generality than the one from which we started. In the former we work up to general principles; in the latter we work down from them, and elicit the particulars which they contain.

Section 431. Hence induction is a real process from the known to the

unknown, whereas deduction is no more than the application of previously existing knowledge; or, to put the same thing more technically, in an inductive inference the consequent is not contained in the antecedent, in a deductive inference it is.

Section 432. When, after observing that gold, silver, lead, and other metals, are capable of being reduced to a liquid state by the application of heat, the mind leaps to the conclusion that the same will hold true of some other metal, as platinum, or of all metals, we have then an inductive inference, in which the conclusion, or consequent, is a new proposition, which was not contained in those that went before. We are led to this conclusion, not by reason, but by an instinct which teaches us to expect like results, under like circumstances. Experience can tell us only of the past: but we allow it to affect our notions of the future through a blind belief that 'the thing that hath been, it is that which shall be; and that which is done is that which shall be done; and there is no new thing under the sun.' Take away this conviction, and the bridge is cut which connects the known with the unknown, the past with the future. The commonest acts of daily life would fail to be performed, were it not for this assumption, which is itself no product of the reason. Thus man's intellect, like his faculties generally, rests upon a basis of instinct. He walks by faith, not by sight.

Section 433. It is a mistake to talk of inductive reasoning, as though it were a distinct species from deductive. The fact is that inductive inferences are either wholly instinctive, and so unsusceptible of logical vindication, or else they may be exhibited under the form of deductive inferences. We cannot be justified in inferring that platinum will be melted by heat, except where we have equal reason for asserting the same thing of copper or any other metal. In fact we are justified in drawing an individual inference only when we can lay down the universal proposition, 'Every metal can be melted by heat.' But the moment this universal proposition is stated, the truth of the proposition in the individual instance flows from it by way of deductive inference. Take away the universal, and we have no logical warrant for arguing from one individual case to another. We do so, as was said before, only in virtue of that vague instinct which leads us to anticipate like results from like appearances.

Section 434. Inductive inferences are wholly extraneous to the science of formal logic, which deals only with formal, or necessary, inferences, that is to say with deductive inferences, whether immediate or mediate. These are called formal, because the truth of the consequent is apparent from the mere form of the antecedent, whatever be the nature of the matter, that is, whatever be the terms employed in the

proposition or pair of propositions which constitutes the antecedent. In deductive inference we never do more than vary the form of the truth from which we started. When from the proposition 'Brutus was the founder of the Roman Republic,' we elicit the consequence 'The founder of the Roman Republic was Brutus,' we certainly have nothing more in the consequent than was already contained in the antecedent; yet all deductive inferences may be reduced to identities as palpable as this, the only difference being that in more complicated cases the consequent is contained in the antecedent along with a number of other things, whereas in this case the consequent is absolutely all that the antecedent contains.

Section 435. On the other hand, it is of the very essence of induction that there should be a process from the known to the unknown. Widely different as these two operations of the mind are, they are yet both included under the definition which we have given of inference, as the passage of the mind from one or more propositions to another. It is necessary to point this out, because some logicians maintain that all inference must be from the known to the unknown, whereas others confine it to 'the carrying out into the last proposition of what was virtually contained in the antecedent judgements.'

Section 436. Another point of difference that has to be noticed between induction and deduction is that no inductive inference can ever attain more than a high degree of probability, whereas a deductive inference is certain, but its certainty is purely hypothetical.

Section 437. Without touching now on the metaphysical difficulty as to how we pass at all from the known to the unknown, let us grant that there is no fact better attested by experience than this--'That where the circumstances are precisely alike, like results follow.' But then we never can be absolutely sure that the circumstances in any two cases are precisely alike. All the experience of all past ages in favour of the daily rising of the sun is not enough to render us theoretically certain that the sun will rise tomorrow We shall act indeed with a perfect reliance upon the assumption of the coming day-break; but, for all that, the time may arrive when the conditions of the universe shall have changed, and the sun will rise no more.

Section 438. On the other hand a deductive inference has all the certainty that can be imparted to it by the laws of thought, or, in other words, by the structure of our mental faculties; but this certainty is purely hypothetical. We may feel assured that if the premisses are true, the conclusion is true also. But for the truth of our premisses we have to fall back upon induction or upon intuition. It is not the province of deductive logic to discuss the material truth or falsity of the

