PRESUMPTIONS IN CRIMINAL CASES.

these allowances, the fact, if established, is strongly inculpatory.

This brings us to the position that a conclusion, in all legal investigations, is based on a cumulation of probabilities. How these probabilities are to be marshalled is thus exhibited by one of the highest modern authorities in this line :

"The truth of a conclusion may be regarded as a compound event, depending upon the premises happening to be true; thus, to obtain the probability of the conclusion, we must multiply together the fractions expressing the probabilities of the premises. Thus, if the probability is $\frac{1}{2}$ that A is B, and also $\frac{1}{2}$ that B is C, the conclusion that A is C, on the ground of these premises, is $\frac{1}{2} \times \frac{1}{2}$, or $\frac{1}{2}$. Similarly if there be any number of premises requisite to the establishment of a conclusion and their probabilities by m, n, p, q, r, &c., the probability of the conclusion on the ground of these premises is $m \times n \times p \times$ $q \times r \times \ldots$ This product has but a small value, unless each of the qualities m, n, &c., be nearly unity.

"But it is particularly to be noticed that the probability thus calculated is not the whole probability of the conclusion, but that only which it derives from the premises in question. Whately's* remarks on this subject might mislead the reader into supposing that the calculation is completed by multiplying together the probabilities of the premises. But it has been fully explained by De Morgan † that we must take into account the antecedent probability of the conclusion; A may be C for other reasons besides its being B, and as he remarks, 'It is difficult, if not impossible, to produce a chain of argument of which the reasoner can rest the result on those arguments only.' We must also bear in mind that the failure of argument does not, except under special circumstances, disprove the truth of the conclusion it is intended to uphold, otherwise there are few truths which could survive the illconsidered arguments adduced in their favour. But as a rope does not necessarily break because one strand in it is weak,

* Elements of Logic, Book III., sections 11 and 18. † Enciclopædia Metrop., art. Probabilities, p. 400.

so a conclusion may depend upon an endless number of considerations besides those immediately in view. Even when we have no other information we must not consider a statement as devoid of all probability. The expression of complete doubt is a ratio of equality between the chances in favour of and against it, and this ratio is expressed in the probability $\frac{1}{2}$.

"Now if A and C are wholly unknown things, we have no reason to believe that A is C rather than A is not C. The antecedent probability is then $\frac{1}{2}$. If we also have the probabilities that A is $B \frac{1}{2}$, and that B is $C\frac{1}{2}$, we have no right to suppose that the probability of A being C is reduced by the argument in its favor. If the conclusion is true on its own grounds, the failure of the argument does not affect it; thus its total probability, added to the probability that this failing, the new argument in question established it. There is a probability $\frac{1}{2}$ that we shall not require the special argument ; a probability 1 that we shall, and probability 1 that the argument does in that case establish it. Thus the complete result is $\frac{1}{2} + \frac{1}{2} \times \frac{1}{4}$, or $\frac{5}{8}$. In general language, if a be the probability found in a particular argument, and c the antecedent probability, then the general result is I - (I - a (I - c), or a + c - ac.

"We may put it still more generally in this way: Let a, b, c, d, &c., be the probabilities of a conclusion founded on various arguments or considerations of any kind. It is only when all the arguments fail that our conclusion proves finally untrue; the probabilities of each failing are respectively I-a, I-b, I-c, etc.; the probability that they will all fail (I - a) (I - b) (I - c) . . ; therefore the probability that the conclusion will not fail is I - (I - a) (I - b) (I - c). . etc. On this principle it follows that every argument in favour of a fact, however flimsy and slight, adds probabil-When it is unknown whether ity to it, an overdue vessel has foundered or not, every slight indication of a lost vessel will add some probability to the belief of its loss, and the disproof of any particular evidence will not disprove the event."---Jevons' Principles of Logic, I., 239.