92 heads and 108 tails, or a divergence of 8 per cent. from the expected 100 each. In the whole 1,000 there were 485 heads to 515 tails, or a deviation of 3 per cent. from the case of 500 each. In a trial of 1,000,000 spins of the rouge et noir roulette at Monte Carlo it was found that 500,000 reds and 500,000 blacks resulted to within about .02 per cent. That is to say, the larger the number of cases, the greater the possibe deviation, but then that possible maximum deviation is a much smaller percentage of the whole, and it is the proportion which tells. This result is well known to insurance men in the aphorism that an abundance of well distributed risks involve practically no risk at all.

As a further illustration, I threw 20 coins 100 times and counted the number of heads and tails in each throw, with the following results:

| | | | |
|---|---|---|---|
| 10 of each .... | 16 times | 16 and 4 .... | 0 times |
| 11 and 9* .... | 35 times | 17 and 3 .... | 0 times |
| 12 and 8 .... | 21 times | 18 and 2 .... | 0 times |
| 13 and 7 .... | 13 times | 19 and 1 .... | 0 times |
| 14 and 6 .... | 11 times | 20 and 0 .... | 0 times |
| 15 and 5 .... | 4 times | | |

*That is either 11 heads and 9 tails or 11 tails and 9 heads

Now the theeoretically expected times for each of these cases are 18, 32, 24, 15, 7, 3, 1, 0, 0, 0, 0, 0, so that we have the following comparison:

| Case. | Theoretical. | Experimental. |
|---|---|---|
| 10 and 10 .... | 18 .... | 16 |
| 11 and 9 .... | 32 .... | 35 |
| 12 and 8 .... | 24 .... | 21 |
| 13 and 7 .... | 15 .... | 13 |
| 14 and 6 .... | 7 .... | 11 |
| 15 and 5 .... | 3 .... | 4 |
| 16 and 4 ..... | 1 .... | 0 |
| 17 and 3 .... | 0 .... | 0 |
| 18 and 2 .... | 0 .... | 0 |
| 19 and 1 .... | 0 .... | 0 |
| 20 and 0 .... | 0 .... | 0 |

The agreement between these two sets of numbers is close enough to show that the fact follows the theory very closely. If the agreement is as close eas this is merely 100 throws, it is easy to see that theory and experiment would concord very closely in 1,000 throws or more so in 10,000 throws.

Some numbers given by Professor Weldon in his address to the British Association in e1898, illustrate the subject more fully. He got his wife to experiment for him with twelve dice, each of which had six faces. These twelve dice were tossed 4,096 times, that being the number which avoids the appearance of fractions in the theoretical calculations. She classed the dice according to the number of points showing on the face. Suppose numbers 1, 2, and 3, to constitutet class A, and numbers 4, 5, and 6, to constitute class B. Then theory would lead us to expect that on the average, six dice would belong to class A and six to class B in each throw. But ,as a matter of fact, the result was found to be 5,865 belonging to class A, and 6,135 to class B, which is a divergence of 2 1-4 per cent. from the theoretical average. This is not an allowable departure for an experiment involving over 4,000 throws. Hence another explanation must be given, and it lies i this—the mraks in the faces of the dice were hollowed out of the face—therefore the face marked 6 was more hollowed and so lighter than the face marked 1. Now 6 was the opposite face to 1, and, as the heavier side tended downwards and the lighter side upwards, it followed that there was a greater likelihood of throwing 6 than of throwing 1; and the same with 5 and 2 and with 4 and 3.

Here, then, was the explanation. The dice not beng symmetrical, class B had a greatetr probability of predominating than class A. Mrs. Weldon therefore tried again with 4,096 throws, and class B included an average of 6,139 dice per throw. Again she tried, and got 6,104, and again 6,116. Thus four distinct experiments agreed amongst themselves to within 1-4 per cent., whilst there was a divergence of over 2 per cent. from the theoretical average for perfectly symmetrical dice. The want of symmetry was therefore a real and effective disturbing factor in the calculations.

## THE "SATURDAY REVIEW" ON INSURANCE.

Insurance business is a good commercial institution, and the affairs of its principal exponents need to be carefully criticised in detail from time to time. Such criticism has done more for British insurance than any system of State supervision could have accomplished, and to such criticism the prosperity of the best companies and the relative failure of inferior offices are largely due. There are, however, many wider aspects of the subject of insurance of which little has ever been said, though they possess many features of great interest. When these wider aspects of the subject are considered, it becomes apparent that insurance is a factor of great importance in social evolution, and that it is as well worth studying in this way as any other branch of human activity. Wages and prices, peace and war, free-trade and protection, wealth, machinery, land, monopolies, demand and supply, have all been treated at length by political economists and others, and attempts have been made to trace and describe their influence. Something of the same kind should be done for insurance. Clear ideas of its nature may be obtained by comparing its progress with the progress of other phenomena, while the consideration of the ways in which it influences, and has been influenced by, other aspects of social, and especially of commercial, life will reveal many unsuspected benefits to be derived from insurance, and supply many convincing reasons for regarding the whole system with greater appreciation than any merely detailed examination of its merits would suggest.

Insurance has reached its highest development in connection with the assurance of lives, and it is with the wider aspects of life assurance that we shall principally deal. One of the first things to notice is the definite character of life assurance at the present time as compared with its crude indefiniteness when the practice of assuring lives commenced. It was for a long time the custom to charge a uniform premium to secure a fixed amount at death. A difference in the risk according to the age of the policyholders was not recognised, and even when mortality tables were introduced they were used in a very indefinite way, and safety was provided for by quite other means than detailed attention to, or knowledge of, the risks involved.

The Northampton Table of Mortality, which was long employed for assurance purposes, was faulty in many important respects, but long after its faults had been recognised it was used as the basis for assurance calculations. The inaccuracy of this table is only another instance of the indefiniteness characteristic