

of quite recent writers¹ to place the whole matter upon a thoroughly scientific basis. But it is not these necessary technical refinements that interest us most at present; rather let us take note how the needs of governments, as well as the uncertainty and risks of life, have automatically led to the definition and study of three distinct statistical conceptions, which in our age govern a very large part of all our practical enterprises. These three conceptions are the probability of future events based upon long series of past experiences, the idea of reducing or averaging risks by "amicable" co-operation, and the "equitable" distribution of the burdens of such co-operation according to the individual units who co-operate.² It will at

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bution.

¹ It is generally admitted that Prof. G. F. Knapp created a kind of era in the more rigorous mathematical treatment of the subject by his various publications, dating from the year 1868 with his tract 'Ueber die Ermittlung der Sterblichkeit aus den Aufzeichnungen der Bevölkerungs-statistik.' M. Block (*loc. cit.*, p. 232) says: "Ce livre a fait une véritable sensation parmi les hommes spéciaux; non que l'auteur ait apporté beaucoup de nouvelles pierres à l'édifice, mais il a donné à ces pierres une ordonnance, une disposition qui les constituent un monument." In the year 1874 he published his 'Theorie des Bevölkerungswechsels.' Many other writers have followed in the new track, among whom I will only mention Becker, Zeuner, and Lexis. The graphical method is largely employed by these authors, amongst whom Zeuner resorts to a representation in three dimensions with some very elegant results. See his 'Abhandlungen zur mathematischen

Statistik' (Leipzig, 1869). A historical and critical review of these and older writings is given in the last-named work of Knapp, p. 53, &c. See also Prof. Lexis's 'Einleitung in die Theorie der Bevölkerungs-statistik' (Strasburg, 1875).

² This is not the place to discuss the social and moral aspects of co-operation, which by future historians will possibly be looked upon as one of the very few novel political ideas which our century has evolved or at least elaborated in a practical form; the older co-operative attempts, such as were made under the influence of the ideals of the great Revolution by Fourier, Saint Simon, and Babeuf in France, and by Robert Owen in this country, not having contained the elements of permanent success. These elements seem to belong almost exclusively to the line of development started by the "Rochdale Pioneers."