at a particular ſum, the preſent single payment paid on admission is found by ſubtracting the value of the annual pay­ment during the joint lives from the whole preſent value of the annuity in one payment. Suppoſe, for inſtance, the annual payments to be fixed at five guineas, the annuity to be 30 l. the rate of intereſt four *per cent,* and the joint lives each 40; the value of the annuity in one preſent ſingle payment is 101. 11. The value of five guineas or 5.25 *per annum,* is (5.25 multiplied by 9.82 the value of the joint lives) 51.55 ; which, subtracted from 101.11. gives 1.49.5, the anſwer.

If a ſociety takes in all the marriages among perſons of a particular profession within a given diſtrict, and ſubjects them for perpetuity to a certain equal and common tax or annual payments, in order to provide life annuities for all the widows that ſhall result from theſe marriages ; ſince, at the commencement of ſuch an eſtablishment, all the oldeſt, as well as the youngeſt, marriages are to be intitled equally to the propoſed benefit, a much greater number of annui­tants will come immediately upon it than would come up­on any similar eſtabliſhment which limited itſelf in the admission of members to perſons not exceeding a given age. This will check that accumulation of money which ſhould take place at firſt, in order to produce an income equal to the diſburſements at the time when the number of annui­tants comes to a *maximum* ; and therefore will be a parti­cular burden upon the eſtabliſhment in its infancy. For this ſome compenſation muſt be provided ; and the equi­table method of providing it is, by levying fines at the be­ginning of the eſtabliſhment on every member exceeding a given age, proportioned to the number of years which he has lived beyond that age. But if ſuch fines cannot be levied, and if every payment muſt be equal and common, whatever diſparity there may be in the value of the expectations of dif­ferent members, the fines muſt be reduced to one com­mon one, anſwering as nearly as poſſible to the diſadvantage, and payable by every member at the time when the eſta­bliſhment begins. After this, the eſtabliſhment will be the ſame with one that takes upon it all at the time they marry; and the tax or annual payment of every member adequate to its ſupport will be the annual payment during marriage due from perſons who marry at the mean age at which, upon an average, all marriages may be conſidered as commencing. The fines to be paid at firſt are, for every particular mem­ber, the same with the difference between the value of the ex­pectation to him at his preſent age, and what would have been its value to him had the ſcheme begun at the time he married. Or, they are, for the whole body of members, the difference between the value of the common expectation, to perſons at the mean age of all married perſons taken to­gether as they exiſt in the world, and to perſons at that age which is to be deemed their mean age when they marry.

Suppoſe we wiſh to know the preſent value of an annuity to be enjoyed by one life, for what may happen to remain of it beyond another life, after a given term ; that is, pro­vided both lives continue from the preſent time to the end of a given term of years ; the method of calculating is this : Find the value of the annuity for two lives, greater by the given term of years than the given lives ; diſcount this value for the given term; and then multiply by the probability, that the two given lives ſhall both continue the given term ; and the product will be the anſwer. Thus, let the two lives be each the term ſeven years, the annuity l. 10,intereſt Four *per cent.* The given lives, increaſed by ſeven years, become each 57. The value of two joint lives, each 37, is (by Table II.) 10.25. The value of a ſingle life at 37 is (by the table under the article Annuity) 13.67. The former ſubtracted from the latter is 3.42, or the value of an annuity for the life of a perſon 317 years of age, after an­other of the ſame age, as has been ſhown above. 3.42 dd- counted for ſeven years (that is, multiplied by 0.76 the value of 11. due at the end of ſeven years) is 2.6. The probability that a ſingle life at 30 ſhall continue ſeven years is 4/5 9/6(b). The probability, therefore, that two ſuch lives ſhall continue ſeven years, is 2/3 4/1 0/3 1/6, or in decimals c.765 ; and 2.6 multiplied by 0.765 is 1.989, the number of years purchaſe which ought to be given for an annuity to be en­joyed by a life now 30 years of age, after a life of the same age, provided both continue ſeven years. The annuity then being 10 l. its preſent value is 1.19.89.

Suppoſe the value is required of an annuity to be enjoyed for what may happen to remain of one life after another, pro­vided the life in expectation continues a given time. I. Find the preſent value of the annuity for the remainder of the life in expectation after the given time, which is done in this manner : Multiply the preſent value of the life at the given time by the preſent value of 1 l. to be received at that time, and multiply the product again by the probability that the life in expectation will continue ſo long. Let the given time which the life in expectation is to continue be 15 years, and let the perſon then be arrived at 50 years of age. A life at fifty, according to Μ. de Moivre’s valuation of lives, and reckoning intereſt at *four per cent.* is worth 11.34 years purchaſe. The preſent value of 1 l. to be received at the end of 15 years, is 0.5553, and the probability that a life at 35 will continue 15 years is 1/4 4/9 6/0, Theſe three values multiplied into one another give L.4.44 for the preſent value ot the life in expectation. 2. Find the value of the reverſion, provided both lives continue the given time, by the rule given in parag. 5th. 3. Add theſe values together, and the ſum will be the anſwer in a ſingle preſent payment. We ſhall now illuſtrate this rule by an example.

An annuity of 10 l. for the life of a person now 30, is to commence at the end of 11 years, if another perſon now 40 ſhould be then dead ; or, if this ſhould not happen at the end of any year beyond 11 years in which the former ſhall happen to survive the latter : What is the preſent value of ſuch an annuity, reckoning intereſt at four *per cent.* and ta­king the probabilities of life as they are in Dr Hailey’s table, given in the article Mortality ?

The value of 10l. *per annum,* for the remainder of the life of a perſon now 30, after 11 years is L. 69.43. The proba­bility that a perſon 40 years of age ſhall live 11 years, is, by Dr Halley's table, 3/4 3/4 5/5. The probability, therefore, that he will die in 11 years, is ſubtracted from unity @@(C), or which multiplied by 1.69.43, gives 1. 17.16.—The value of the reverſion, provided both live 11 years, is 17 l. and this value added to the former, makes l. 34.16. the value required in a ſingle preſent paymcnt ; which payment divided by 1. 11.43, the value of two joint lives, aged 30 and 40, with unity added, gives 3 l. ; or the value required in annual payments during the joint lives, the firſt payment to be made immediately.