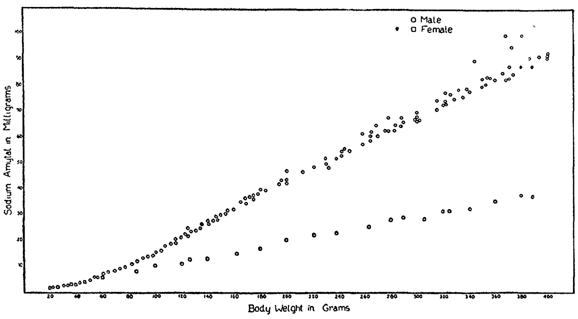

FIG. 1. A graph illustrating the relation between the body weights of albino rats and the amount of sodium amytal in milligrams necessary to produce deep anesthesia.

male rats which in a previous report were obtained only upon males ranging between one hundred and twenty-five and two hundred and fifty grams in weight. For comparison, the dosage for females of a corresponding range of weights has also been plotted. The graph therefore demonstrates the sex difference in the reaction to sodium amytal and defines clearly the weight at which this sex difference appears.

To determine whether or not the greater resistance of the male rats was to be associated with the presence of the gonads, ten adult male rats weighing about one hundred and seventy-five grams each were castrated. Six weeks later these animals were weighed and given the male dose normal for their weight. None of the animals survived. A second group of five adult animals about two hundreds grams in weight were castrated and anesthetized at the end of six weeks. These animals were more resistant to sodium amytal than females but were markedly less resistant than normal males.

A third series of ten young males about thirty grams each were castrated. Each week following castration the animals were anesthetized. The normal male dose for their weight was invariably necessary to produce deep anesthesia. These animals were castrated before they had developed the sex difference in their reaction to sodium amytal; nevertheless they retained the resistance normal to uncastrated males throughout their growth and development. The resistance of males castrated before the sex difference has appeared, therefore, is unaltered, but males castrated when adults become definitely more susceptible.

Although not more than suggestive, it is interesting to note that the weight at which the sex difference appears—between fifty and sixty grams—is also the weight at which the differential growth relation of both the hypophysis and the suprarenals first appear between the males and females.[3] The female rat has the heavier hypophysis and suprarenal glands.

The effect of the dilution of the solution of sodium amytal with which anesthesia is produced has been discussed earlier. The animals were much more resistant to equal quantities of the drug if administered in more dilute solutions. This fact suggested that injections of mammalian Ringer's into the blood stream of an over-anesthetized animal might reduce the effectiveness of the original dose and aid in the recovery of the animal.

Both males and females were injected with one and a half times the normal dose for their weight. After the animal was well under the anesthetic the femoral vein was exposed and eight cubic centimeters of mammalian Ringer's—either warm or cold—was injected into the blood stream. The controls were anesthetized in the same way but were not injected with Ringer's. All the animals that received the injection of Ringer's solution (ten) recovered from the anesthetic. The ten control animals, however, all died from respiratory failure typical of over-anesthetized animals. This method of reducing the effectiveness of the drug by injections of Ringer's into the blood stream has proved of value in saving an occasional animal which is more susceptible to sodium amytal than the normal.

These facts appear to be directly related to the action of sodium amytal, for rats demonstrate no sex difference to nembutal. The dose for both males and females is the same as the male dose of sodium amytal in a ten per cent. solution. The injection of Ringer's into the blood stream of rats over-anesthetized with nembutal is not effective.

The injection and dilution experiments indicate that resistance to sodium amytal is in some way related to the water metabolism of the animal. This is further supported by the correlation between the time of the development of the sex difference in rats and the differential growth rate of the hypophysis and the suprarenal glands. The castration experiments then imply that in the adult the testes influence the water metabolism control, although when removed before this function is developed, other factors within the body compensate for their loss.

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SIBLING RESEMBLANCE AND ITS RELATION TO AGE INTERVAL

STOCKS[1] has recently published an investigation in which the resemblance of siblings in a number of

[3] H. H. Donaldson, "The Rat: Data and Reference Tables." Memoirs of the Wistar Institute of Anat. and Biol., No. 6, Philadelphia, pp. 469, 1924.

[1] Percy Stocks, "A Biometric Investigation of Twins and Their Brothers and Sisters," *Annals of Eugenics*, 4: 49–108. 1930.

physical and physiological traits has been examined to determine whether the interval between births of children of the same parents is related to degrees of resemblance. His results furnish no definite evidence that the interval between births has any influence on degree of resemblance in the traits studied. To date there has been published no direct attack of a similar nature upon the question of resemblance in mental traits.

For the past two years the author has been collecting data from intelligence tests administered to two or more members of a family with the idea of trying to reveal any relationship existing between age interval and degree of resemblance of siblings in mental capacity (within the limits to which paper and pencil tests measure mental capacity). The present results are based on the records of 1,012 pairs of native-born white siblings, representing 614 families and having age differences ranging between one and eleven years. Three groups, including superior, average and inferior ability, respectively, were obtained by drawing upon schools enrolling children from widely different socio-economic strata.

In all cases the two members of a pair were tested with the same tests and under similar conditions, in so far as this was possible. For example, children from any one school were all tested when they had progressed to a given grade level, so that the average age at test was approximately equal for the older and younger members of all pairs.

The principal method of analysis employed to discover any possible relationship existing between age interval and difference in intelligence was that of product-moment correlation. For each group of data this relationship was computed by entering the difference of a pair in I. Q. on the x axis, and their difference in age on the y axis. The obtained correlations, as will be seen from Table 1, indicate no tendency for children within a family, far apart in age, to resemble each other less than children born near together.

TABLE 1

RELATION BETWEEN I. Q. DIFFERENCE AND AGE INTERVAL OF SIBLINGS

X = I. Q. difference
Y = Age difference in months

Group	r_{xy}	P.E.*	M_x	M_y	σ_x	σ_y	N*
I	−.001	.036	10.59	41.04	7.83	23.70	359
II	−.006	.049	11.55	32.34	8.04	15.78	188
III	+.058	.032	10.86	43.20	8.10	25.26	465

* The values of N given here, and employed in computing the values of P. E. here reported, are in each case the number of pairs, and, since some individuals entered more than one pair, are greater than the actual number of cases involved. These P. E. values are therefore slightly below the true probable errors.

The data of Group I are probably most free from selective factors favoring the inclusion of bright young and dull older sibs. In this group the mean I. Q. of the 359 paired as older was found to be 117.6 as compared to a mean of 118.0 for the 359 paired as younger. The difference in mean I. Q. (.4) is less than its own probable error, and gives no evidence of superiority of later over earlier born members of a family. It may also be pointed out that the degree of sibling resemblance has been computed for each group of data. This has been done by entering the I. Q. of the older member of each pair on the x axis, and the I. Q. of the younger on the y axis. The resulting values for r were .49, .52 and .34, respectively. The first two of these are probably fairly accurate measures of the degree of sibling resemblance in representative groups; the latter is lower than the true degree of resemblance because of a marked restriction of range in the data employed.

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