of social inhibition is reflected in the number of fresh wounds recorded at each time of handling. It is the loser in a combat which usually receives wounds as it turns to flee. L-3 females received nearly 10 times as many wounds as L-5 females.

It so happened that the total number of pregnancies for the females in each litter to the last date of handling was the same. The contrast between the two groups in their reproductive history lies in the fate of their litters. Although the socially dominant, larger females were known to have weaned 10 litters from their 12 pregnancies, the socially inhibited individuals with a retarded growth rate definitely weaned no more than one litter. These observations give no direct evidence as to the cause of the differential survival rate of the young of these two groups of females. However, the histories of the mothers indicate that there is a physiological and psychological disturbance in socially inhibited individuals which might have a deleterious effect on the progeny either through poor foetal nutrition or from breakdown of maternal instincts. At any rate, social conditioning may be a potent factor in population control among mammals.

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Chemical Analysis of Spectrophotometric Findings in the Cerebrospinal Fluid

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An attempt to interpret the absorption band shown by cerebrospinal fluids (CSF's) at 2,650 A has to take into consideration a number of substances (*4*): barbiturates, ascorbic acid, purine-pyrimidine compounds and also, to a certain extent, proteins, although the latter give a maximum absorption at a somewhat longer wavelength (2,750 A). While it is easy in most cases to exclude barbiturates by avoiding or stopping their administration several days before the spinal tap, it seems desirable to determine by chemical methods the relative participation of the other components responsible for the absorption at 2,650 A. In 40 CSF's of patients with organic or functional nervous disorders, the ultraviolet absorption and the ascorbic acid content were determined simultaneously, the first by means of a Beckman photoelectric spectrophotometer, the latter by the method of Robinson and Stotz (*2*), as recommended by Satterfield (*3*), and using a Klett-Summerson colorimeter. The data resulting from routine examination of the CSF (total protein, globulin, cell count, Wassermann, colloid gold) were available. In cases in which these data and/or a shift of the ultraviolet peak to 2,750 A indicated an increase of proteins, we determined the protein content also, after the spectrophotometric study; the opalescences caused by sulfosalicylic acid both in a known standard solution and in the CSF were compared by means of the Klett-Summerson colorimeter.

With the help of our standardization graphs, the ascorbic acid values were converted into extinction coefficients and these values (Ea) were subtracted from the experimentally determined extinction coefficients of the CSF (Ecsf) so that a difference (D_1), unaccounted for by the ascorbic acid, resulted. Similarly, the protein values were converted into extinction coefficients (Ep), so that finally a residual value (D_2 = Ecsf-Ea-Ep) was obtained.

The material was arbitrarily divided into three groups, one with low D_1 values (0–0.4), one with intermediate D_1 values (0.41–0.8), and one with high D_1 values (above 0.8). In the first group showing D_1 values below 0.4 and D_2 values up to 0.14, apparently the ascorbic acid and protein content of the CSF accounted for the selective absorption with the peak at 2,650 A. These were cases without definite structural alterations of the central nervous system or with preponderant lesion of the white matter, cases studied one or more years after cerebral injury or in the early stage of cerebral affection.

In group II, showing D_1 values between 0.45 and 0.8 and D_2 values up to 0.61, there were cases of herniated discs, cerebral dysrhythmias, head traumata, an encapsulated metastatic carcinoma of the brain, and a hydrocephalus.

In group III, with D_1 values varying between .84 and 2.3 and D_2 values up to 2.16, ruptured discs, producing spinal block, convulsive disorders, concussion studied shortly after the accident, post-traumatic encephalomalacia, compression of the spinal cord, and particularly tumors of the central nervous system were found. It should be emphasized that this enumeration is only descriptive, and that differential diagnostic conclusions will depend on further studies on a larger material.

These findings indicate that the selective absorption of CSF's cannot be explained in all instances by the ascorbic acid and protein content as claimed by some authors (*1, 7*). In interpreting the residual D_2 values, it seems of interest that they were particularly pronounced in tumors of the central nervous system, i.e., in conditions where a marked destruction of nuclear substances may be expected. It should also be noted that there was a statistically significant difference between the mean E of normal control CSF's and that of CSF's withdrawn between 1 hr and 2 months after cerebral concussion (*6*), and also that D_2 values above the normal range were demonstrable in CSF's tapped shortly after cerebral concussion. These observations are mentioned because this type of cerebral trauma induces chromatolytic changes in the nerve cells (Windle *et al.*, *8*). It therefore seems justified to assume that the residual D_2

values observed are caused chiefly by constituents of nuclear substances such as purine-pyrimidine compounds.[1] These are not necessarily nucleic acids, but may be their cleavage products, as pointed out previously (Spiegel-Adolf *et al.*, *5*).

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Some Effects of Nonherbicidal Concentrations of 2,4-D on the Development of the Bean Plant

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Reports on the influence of nonherbicidal concentrations of 2,4-D on bean plants have been published by Wittwer and Murneek (*8*), Weaver (*7*), Burton (*1*), and Stromme and Hamner (*6*). The results of the preliminary experiment reported here confirm and extend previous observations on the morphological effects of 2,4-D on beans and on the delaying and inhibiting effect of 2,4-D on reproductive development found by Weaver (*7*) and Stromme and Hamner (*6*). No hastening of maturity or increase in yield such as was reported by Wittwer and Murneek (*8*) was found in this study.

Plants of *Phaseolus vulgaris* L. (var. bountiful) were sprayed on both surfaces of all leaves with 1, 5, and 10 ppm of the sodium salt of 2,4-D on February 27, 1948, when they were 21 days old and had two fully expanded compound leaves. Although there were only four replications per treatment because of space limitation, statistical analysis of the data secured indicated the differences reported here to be statistically significant except where otherwise noted. Daily observations of the development of each plant were made, and all abscised leaves were retained for inclusion in the final dry weight determinations. The plants were allowed to complete their life cycles. No pods were removed until they were dry and mature, but they were picked before dehiscence to avoid the loss of seeds. By April 30 all leaves had abscised and all seeds matured. Dry weights were then determined.

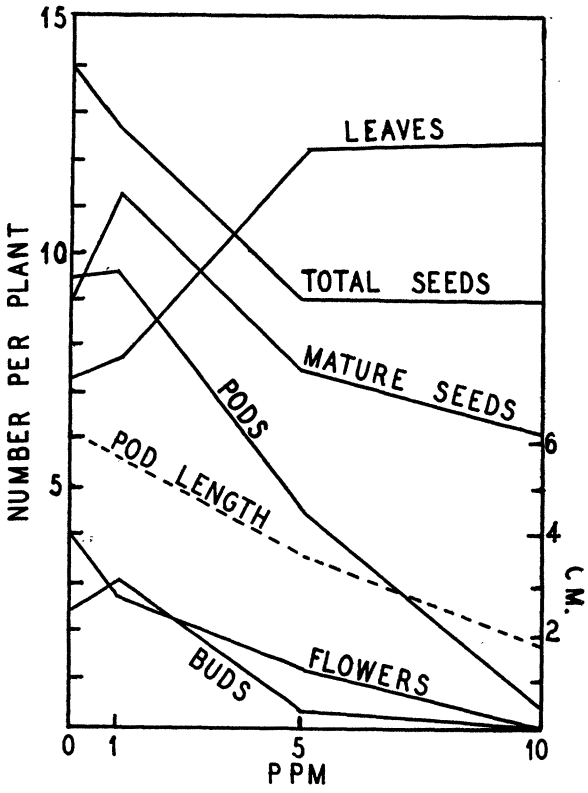

Fig. 1. Mean number of parts per plant and mean length of pods, illustrating the delaying and inhibiting effect of 2,4-D on reproductive development. The data on flowers and flower buds were secured March 10, on pods March 19, and on seeds and leaves April 30.

None of the treatments produced visible effects on the opposite, simple leaves, but the compound leaves of plants sprayed with 5 and 10 ppm exhibited characteristic inward rolling and epinasty. In three plants receiving 10 ppm the stem assumed a horizontal position, and the youngest fully expanded leaf a vertical position. The stem resumed vertical growth at the next node, but the horizontal portion remained in that position. Otherwise, recovery from epinasty had occurred by March 3. The 5- and 10-ppm concentrations caused a temporary inhibition of growth in height, but there were no significant differences in final height. By March 13 all plants sprayed with 5 and 10 ppm and, to a slight degree, some of those sprayed with 1 ppm had developed new leaves with crinkled, lanceolate, and mottled leaflets. The tissue adjacent to the veins became chlorotic, but the leaflet margins and vein islets remained green. By March 19 the leaves of the control plants and some of those on plants which had received 1 ppm were turning yellow, apparently due to the approach of maturity, but all leaves on the plants which received 5 or 10 ppm were still dark green. Small, white, conical outgrowths developed on the

[1] In this connection, it also seems noteworthy that in some conditions associated with a statistically significant increase of the selective absorption of the CSF at 2,650 A (e.g., following repeated electro-shock treatment), substances able to split *added* nucleic acids are increased in the CSF (*5*).