the inner loop of the lower coil and is permanently attached to it vertically at a point 25 mm from the lower end. The shorter rod is permanently attached at one end of the outer loop of the lower coil so as to be parallel to

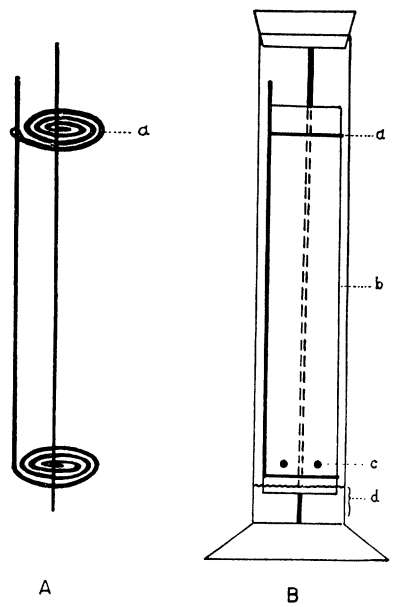

FIG. 1. Chromatographic apparatus. A—Paper holder with adjustable coil (a). B—Assembled apparatus, showing adjustable coil (a), paper (b), position of test spots (c), and liquid volume (d).

the other rod. The two rods are passed through the corresponding loops of the upper coil but are not fastened to them. Since the upper coil can be raised or lowered, it is possible to use sheets of paper of different size, up to 350 mm square. A paper sheet is loaded conveniently by threading it through the coils with a gentle rolling motion.

Chromatograms are usually run on sheets of filter paper 300 to 330 mm long and 230 to 280 mm wide. For one-dimension chromatograms, both the standard and unknown solutions are pipetted onto the paper at a distance of 25 mm from the bottom of the sheet. The liquid usually covers an area 3–5 mm in diameter. After the spots have dried, the paper is rolled into the paper holder. The paper should extend about 10 mm below the lower coil and about 25 mm above the upper coil. The loaded paper holder is quickly placed in a 1-liter cylinder, containing 100 ml or less of solvent, with about 10 mm of the lower edge of the paper in the solvent. The cylinder is closed with the rubber stopper and if it has a lip the hole is sealed with adhesive cellophane tape. The liquid is allowed to ascend by capillary action for a fixed period of time. After expiration of the allotted time, the chromatogram is removed from the cylinder and dried in a stretched horizontal position and then analyzed according to the particular method in use.

For a two-dimension chromatogram, a single spot of test solution is placed in the lower left corner of the sheet of paper, approximately 50 mm from the edges, and the sheet is then placed in the paper holder and treated as described. After expiration of the allotted time, the chromatogram is dried. The sheet is then placed in the paper holder in such a manner that the separated constituents are made to travel upward along the paper at a right angle to the direction from which they moved previously. The final chromatogram is removed, dried, and analyzed.

This apparatus has a number of advantages. It is simple in design, requires small space, and is airtight. The chamber can easily be protected from light if the compounds are light sensitive and construction can be all-glass if conditions demand.

Reference

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Note on an Index of Conformity

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An index to measure the degree of conformity to some norm, or single class interval, of a variable is here proposed. It is an improvement in percentage form of the 4th moment (in sigma units) or Pearson's beta sub-two (taken from an arbitrary origin), which Peters proposed under the label of an "index of institutionalization" (*1*). This index had grown out of studies such as those by Allport on the "J curve of conforming behavior." The formulas for our "index of conformity" (Cfy) and graphs of its behavior are given in Fig. 1. Its derivation is simply that, since the 4th moment varies from unity to infinity, its reciprocal will vary between the limits of 1 to 0. This measures nonconformity so that the complement from unity of this reciprocal is taken to measure degree of conformity. This proportion is multiplied by 100 to express it in familiar percentage units. The origin about which the moment is calculated is the norm or class interval of expected behavior, i.e., any arbitrary origin to which the degree of conformity of the data is to be tested.[1]

$$\text{Cfy} = 100(1 - (\Sigma x^2)^2/N\Sigma x^4)$$

where $x = X - \text{norm}$.

This index measures the degree of concentration in, or dispersion from, one class interval which may be the norm in the social mores, or may be any class interval set up by the analyst as an hypothesis for testing the degree of conformity of the data to it. It measures kurtosis on a scale where 100% is maximum, around 67% is mesokurtic, around 50% is platykurtic, and 0% is negatively

[1] At the limit of complete conformity, when all deviations from the norm are zero, beta sub-two becomes indeterminate, needing evaluation. Aside from the mathematics of this case, its computation gives no trouble, since conformity is evidently maximal and can be so recorded on mere inspection.

leptokurtic or maximal anticonformity.[2] In Fig. 1, the base lines correspond to the amount of conformity of each graph in the conformity scale (Cfy) at the left. Graphs

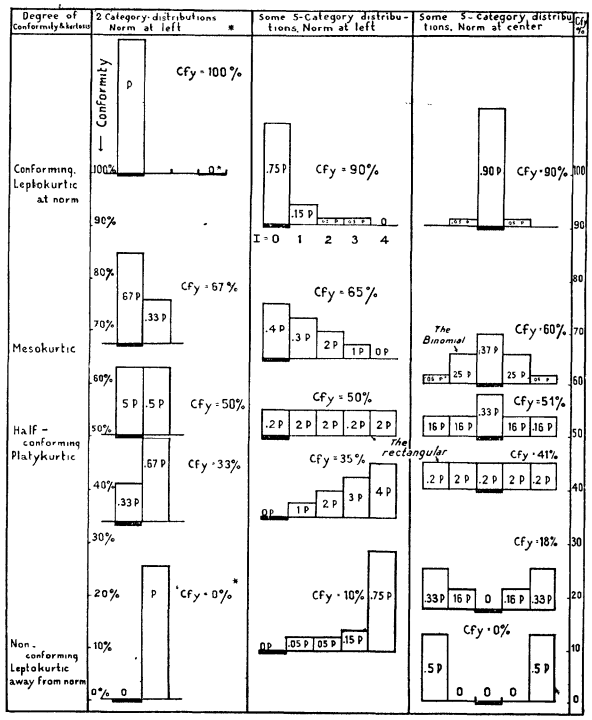

FIG. 1. Conformity distributions.

Conformity = Every person in the standard or norm class interval (underlined) which is expected by the mores. Cfy = 100%

Nonconformity = Every person furthest from the norm class interval (underlined) which is expected by the mores. Cfy = 0%

* It makes no difference whether many or no categories intervene in a two-category distribution.

are presented for the simple two-category cases of conforming or nonconforming in the first column, and for the case of five categories or class intervals of the variable in the second and third columns (which differ only in that the norm is at one extreme in the second column and is at the middle in the third column). The graphs show clearly for some common types of distributions how perfect conformity means that all the frequencies are in the norm class interval; around 50% conformity means a rectangular distribution in general, with the frequencies equally divided among all class intervals, and 0% conformity means that the frequencies are all concentrated in the class intervals furthest away from the norm. Further features of this index are seen to be that it is applicable to all shapes of distributions and that it is independent of the unit in which the variable is expressed. It is a percentage or pure number, since in its formula the dimensions of the numerator and of the denominator cancel each other out, leaving a dimensionless ratio. It thus measures conformity to a norm expressed as a percentage of maximal conformity. A further feature of this index is that in the two-category cases of conformity or nonconformity it becomes identical with the simple percentage of persons conforming, and thus is readily interpretable by laymen.

Within certain limits, this conformity index indicates unimodality to bimodality. It indicates this best in symmetric distributions when the norm is central. Then a Cfy of 100% indicates perfect unimodality; while Cfy of 0% indicates perfect biomodality. Intermediate degrees of Cfy, while not measuring the tendency for the distribution to have one versus two peaks, measure the underlying tendency for the population to be concentrated around one class interval (the norm at the center) or dispersed into two concentrations around the two extreme class intervals. Cfy is not a constant measure of bimodality, since the relation of Cfy to degree of bimodality will shift with the conditions. Thus, under conditions of an asymmetric distribution with the norm not central, 0% will not indicate perfect bimodality.

As the index drops it reflects a homogeneous or unified population, becoming separated into two opposite camps with respect to the characteristic measured. Cfy thus can measure the degree of enmity or opposition of two groups along a given dimension. Cfy does not measure the dichotomizing of a group into two camps under all conditions; rather it measures the conformity or absence of deviation of a group from a norm.

This index should have wide usage and great convenience in sociology, psychology, and other fields in measuring the degree of deviation from some expected behavior or conditions wherever that is one of two or more possible class intervals of such behavior or conditions. It can crucially test hypotheses.

For judgments of sampling reliability, one may use the standard error of the 4th moment, whether calculated about the mean or about an arbitrary origin. For large samples, this is the usual $\sigma^4\sqrt{96/N}$. Or one may use the standard error of beta sub-two about an arbitrary origin.

For an example of its use, Peters' data of automobile drivers keeping in their proper lanes on highway curves may be taken. His data are 85.3% in lane, 12.1% crossing less than half, 1.7% crossing more than half, 0.8% crossing fully into the other lane, giving an index of institutionalization of 15.3, which cannot be readily interpreted unless one has many such indices in mind to compare it with. The index of conformity for these data is 93.5%, which has immediate interpretation even to lay-

[2] The mesokurtic and platykurtic percentages will vary somewhat, depending on the shape of the distribution, the number of class intervals, and the location of the norm between the center and one end. Thus the mesokurtic normal probability curve with $B_2 = 3$ has an index of conformity of 67% when the norm is at the mode. For another example, the platykurtic rectangular distribution of five class intervals illustrated in Fig. 1 has a conformity index of 50% when the norm is at one end and 41% when the norm is the middle class interval. Cfy measures kurtosis strictly only when the norm is the mean.

men as being 93.5% of maximal or perfect conformity to the traffic regulations.

Reference

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Histological Effects of Treatments with Growth-regulating Substances of the 2,4-D Group[1]

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Recent anatomical studies of the bean plant (*2*) and nut grass (*1*) treated with growth-regulating substances of the 2,4-D group (2,4-dichlorophenoxyacetate) have shown that the internal modifications in the monocot are closely similar to those occurring in the dicotyledonous bean plant; and that a monocot, which from superficial study might be reported insensitive or slightly sensitive because of little or no external evidence of effect of the treatment, may be seriously affected in internal structure. Because of difference in method of growth in dicots and monocots the histological modifications naturally vary somewhat in the two plants in type and in position in the plant body, and the external form of the affected organs is modified in different ways. In monocots, external structural effects are commonly less evident than in dicots and may not be at all apparent if the plant dies soon after treatment. Detailed descriptions and photomicrographs of the anatomical modifications of the two plants under treatment are in the papers listed in the references.

In both plants, the modifications occur in immature tissues, as has long been recognized, or in tissues that, though mature, become readily meristematic, especially the pericycle and endodermis. Under both types of growth, primary phloem is distorted or destroyed. In the nut grass, the phloem of the vascular bundles in the growing leaf bases does not form or is destroyed as replacement tissue forms. The xylem is also distorted and its cells filled with gummy substances. The mature vascular bundles in the corm are uninjured. In the bean leaf also, the phloem is distorted or destroyed, and in the young bean stem the primary phloem is destroyed and no secondary phloem forms.

In addition to vascular distortion and reduction, two general types of modification occur: (1) That in which the course of cell and tissue development is so changed that the normal cells and tissues of the region are supplanted by a special type of fleshy parenchyma—with cells proportionately large, more or less irregular in form, strongly vacuolate, without chloroplasts, and with few or no intercellular spaces (Fig. 1B, D). This tissue is suitably called replacement tissue. (2) That in which

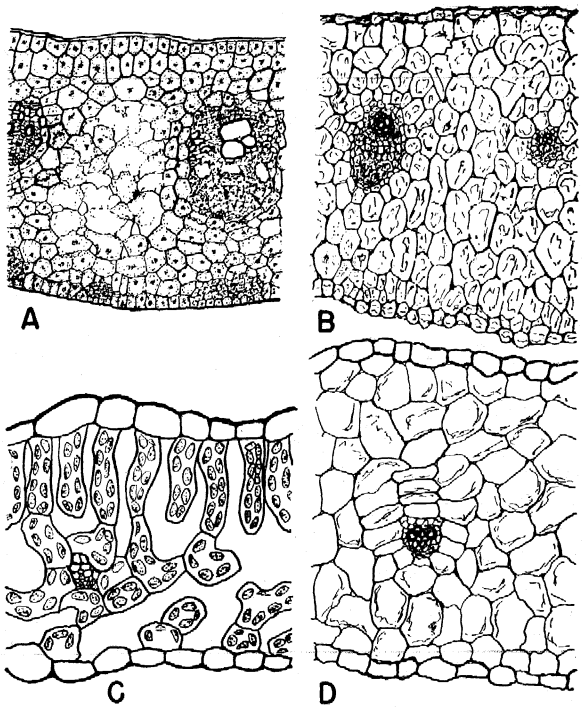

FIG. 1. Transverse sections of portions of normal and treated leaves of nut grass and bean plant. The treated leaves of both plants show increased thickness, replacement tissue, and abortive vascular bundles. A,B, nut grass: A, normal leaf nearing maturity, showing beginnings of differentiation of epidermis, mesophyll, vascular bundles, fiber strands, and aerenchyma; cells with much cytoplasm and conspicuous nuclei. B, treated leaf of about the same stage of maturity as A, lacking normal differentiation of tissues, showing replacement tissue with cells strongly vacuolate and cytoplasm scanty; the vascular bundles reduced and distorted. C, D, bean plant: C, normal mature leaf showing differentiation into epidermis, mesophyll, and small vascular bundle; mesophyll with abundant chloroplasts. D, mature treated leaf showing replacement tissue with cells strongly vacuolate, without chloroplasts: cytoplasm scanty; vascular bundle distorted.

the response is one of rapid and continuing proliferation of a layer or layers of cells somewhat similar to that of cambial activity (Fig. 2B, D), producing uniform, thin-walled parenchyma cells, some of which become richly cytoplasmic, closely resembling promeristem cells, and give rise to root initials. Proliferation from both vascular and nonvascular tissues is frequent in the young bean plant, with the new tissues arising chiefly from vascular derivatives. In the monocot stem, where there is no cambium, only pericyclic (and to a small extent endodermal) tissue takes part in the formation of new tissue. Proliferation in the stele may extend outward along the leaf traces.

[1] This paper is based upon work done for the Biological Department, Chemical Corps, Camp Detrick, Frederick, Maryland, under Contract No. W-18-035-CM-168 with Cornell University.