

kelten Samen, die unverkennbar geringere Vitalität der Keimlinge und die Schwierigkeit ihrer Aufzucht zu blühenden Pflanzen. Sehr wahrscheinlich spielen auch bei den einseitigen Nachkommen aus interspezifischen Bestäubungen die Korrelationen zwischen Embryo und Endosperm Bildung und damit der späteren Ernährung des Embryos – wie in Fällen der Pseudogamie – eine entscheidende Rolle.

Durch den Nachweis ihrer Entstehung und die Analyse von Phäno- und Genotypus der «maternal hybrids» in einigen Gattungen der Blütenpflanzen wird unsere Kenntnis der in der Fortpflanzungssphäre der Blütenpflanzen ausserhalb des «Normalfalles» typischer Amphimixis vorhandenen Möglichkeiten erweitert. *Der Entstehung muttergleicher Nachkommen nach Kreuzungen an und mit autonom-apomiktischen, wie von Arten mit induziert-apomiktischer Samenbildung, schliessen sich, mit allerdings weitaus bescheideneren Nachkommenschaftsraten im Einzelfall, die Erscheinungen der Haplo- und insbesondere der Diplo-Parthenogenesis zwanglos an.*

Die im vorstehenden besprochenen Studien zum Problem muttergleicher Nachkommen nach interspezifischen Bestäubungen bringen eine Erklärung für manche bis anhin gemachte und wohl weitere in Zukunft noch zu machende Feststellungen über Ausnahmen und Abweichungen in den Resultaten von Vererbungsstudien nach intra- wie nach interspezifischen Elternkombinationen. Sie bestätigen wieder die Erkenntnis, dass man sich auch in der Genetik, wie in jeder andern experimentell-biologischen Forschungsrichtung, damit abfinden muss, dass alle unsere Erfahrungen, Vorstellungen und Begriffe vom sogenannten normalen Geschehen nur Abstraktionen und Verallgemeinerungen aus einer mehr oder minder grossen Zahl von Einzelfällen bleiben und in keiner Weise das in Raum und

Zeit unermessliche natürliche Geschehen erklären oder auch nur begreiflich machen.

Summary

A concise survey is given of the possibilities of producing *motherlike* descendants: the so-called "maternal hybrids", after interspecific pollinations in flowering plants.

On the basis of his extensive experiments in pollination and interspecific crossings with species of different sections of the genus *Primula*, the author believes that he has proved that the motherlike descendants from interspecific crossings in *Primula*—as in other genera like *Solanum* and *Digitalis*—are the result neither of amphimictic combination nor of partial aposporic or pseudogamic reproduction. They are rather the result of parthenogenetic embryo formation in developing seeds, the smaller part perhaps of haplo-, the greater and more conspicuous part of diplo-parthenogenesis.

With these unexpected additions, the possibilities of the origin of motherlike descendants from interspecific crossings now include:

(1) Mother (or Father-) like descendants from *normal amphimictic reproduction* after crossings of two species from which the one transfers the dominant, the other the recessive alternatives of the distinguishing morphological and physiological characters.

(2) Motherlike descendants of *non-amphimictic origin* after interspecific pollination on and with *obligate or partial aposporic and pseudogamic species*.

(3) Motherlike descendants of *non-amphimictic origin* from interspecific crossings of normal sexual species, *from seeds with embryos from haplo- or diplo-parthenogenetic development*.

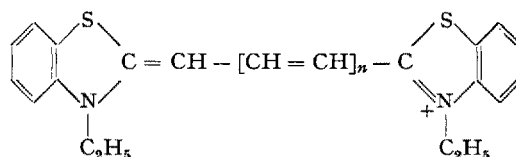
With the description of this third category of formation of motherlike descendants, the circle of possibilities seems to be closed. One may now presume that all facts or "maternal hybrids" cited—except those from crossings with definitely proved "experimental errors"—can be explained by one of the possibilities cited above.

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On Stereoisomerism in the Cyanine Dye Series

In the course of his highly interesting studies on the quantitative interpretation of the light absorption of organic dyes, based on an electron gas model, KUHN¹ has presented a theoretical discussion of the spectral bands of symmetrical cyanine dyes corresponding to the general formula²:



When the pertinent calculated *f*-values were compared with the available experimental data, some discrepancies obtained which were explained by KUHN as follows: «Immerhin zeigt sich, dass die experimentell erhaltenen

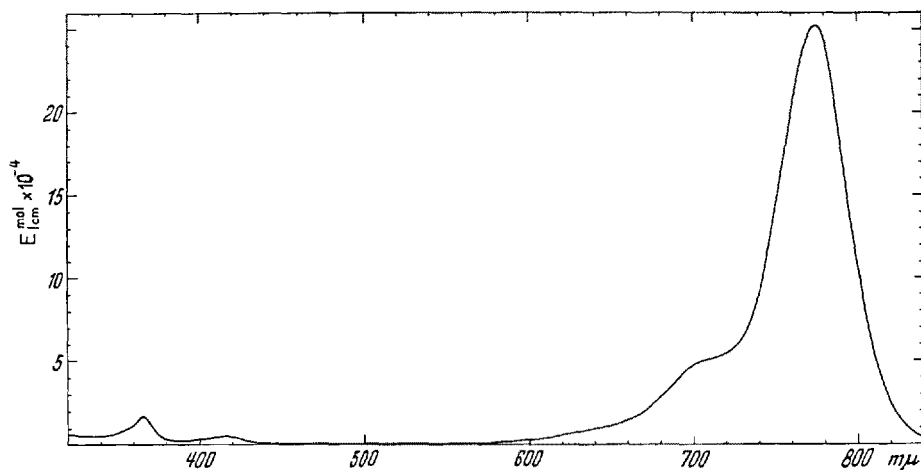
¹ H. KUHN, *Helv. chim. Acta* 34, 1308 (1951).

² Cf. L. G. S. BROOKER, R. H. SPRAGUE, C. P. SMYTH, and G. L. LEWIS, *J. Amer. chem. Soc.* 62, 1116 (1940).

Werte etwas kleiner sind als die theoretisch gewonnenen Beträge. Dieser Befund dürfte... zum Teil damit im Zusammenhang stehen, dass nicht alle Polymethinketten der einzelnen Farbstoffmolekeln in Trans-Konstellation angeordnet sind, dass vielmehr ein Gemisch verschiedener cis-trans-isomerer Verbindungen vorliegt, ähnlich wie dies nach ZECHMEISTER u. a. im Falle der Polyene anzunehmen ist.»

meter between eluates of the respective pigment zones. Thus, in numerous experiments, the same spectral curve was obtained from any form (Fig.)¹.

In accordance with KUHN's concept, we believe that solutions of at least the member studied in the cyanine dye series contain a stereoisomeric equilibrium mixture, in which, evidently, not all possible cis-trans forms are present in equal quantities but a few configurations



Molecular extinction curve of the $n = 3$ representative of the symmetrical cyanine dye series (in ethylene chloride).

Considering the theoretical importance of the point made by KUHN, we wish to report briefly on some unpublished experiments concerning stereoisomerism of the $n = 3$ member of the above series.

First, according to FISHER and HAMER¹, the quaternary iodide was prepared which did not reveal more than a single zone on the chromatographic column. The iodide was converted into the corresponding chloride simply by a short heating of its ethylene dichloride solution. This solution was purified by chromatographing on calcium carbonate and the upper main zone was cut out. Upon elution with a mixture of ethylene chloride and methanol, the latter was eliminated by washing with concentrated saline solution. The ethylene chloride was then evaporated *in vacuo*, the cyanine chloride taken up in some methylene chloride and crystallized by the addition of hexane (rectangular prisms).

When a fresh ethylene chloride solution of these crystals was adsorbed on calcium carbonate and developed with ethylene chloride containing 10 per cent acetone, three sharply differentiated dark blue zones appeared although no marked interzones were observed. The uppermost zone, very probably containing the all-trans form, showed the darkest shade. When any of the three zones was cut out, eluted as described above, transferred into ethylene chloride and rechromatographed, exactly identical chromatograms, composed of the three zones obtained. The colorimetrically measured ratio of the three pigment forms was practically constant, viz. 82:13:5 (from top to bottom).

The spontaneous interconversion of the stereoisomers at room temperature, during elution and transfer operations, took place at such high rates that refluxing, exposure to sunshine, etc., did not essentially alter the ratio mentioned. Neither was it possible, for the same reason, to differentiate in the BECKMAN spectrophoto-

predominate as had been observed earlier in the field of diphenylpolyenes and carotenoids².

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California Institute of Technology, Gates and Crellin Laboratories of Chemistry, Pasadena, California, No. 1744, October 15, 1952.

Zusammenfassung

Chromatographische Beobachtungen stützen die auf spektraltheoretische Berechnungen basierte Annahme von H. KUHN, dass in gewissen Zyaninfarbstofflösungen ein Gemisch von cis-trans-isomeren Formen vorliegt.

¹ For a curve of the iodide in methanol, taken between wave lengths, 540–820 $m\mu$ cf. L. G. S. BROOKER, R. H. SPRAGUE, C. P. SMYTH, and G. L. LEWIS, J. Amer. Chem. Soc. **62**, 1116 (1940); cf. also A. L. SKLAR, J. chem. Phys. **10**, 521 (1942).

² L. ZECHMEISTER, Chem. Reviews **34**, 267 (1944).

Phospholipid-Cholesterol Complex in the Structure of Myelin

When the principal long spacings in the X-ray diffraction pattern of fresh normal nerve are compared with those of specimens which have been modified either by previous drying and re-wetting with RINGER solution¹, or by freezing and thawing², or by treatment with lipid solvents², it is seen that the modifications of structure apparently lead to increases in diffraction spacings. Similarly, when "residual complex" spacings of normal dried

¹ N. I. FISHER and F. M. HAMER, J. chem. Soc. (London) **1933**, 189.

¹ J. ELKES and J. B. FINEAN, Discussions of The Faraday Society, No. 6 (Lipoproteins), p. 134 (1949).

² J. ELKES and J. B. FINEAN, Exp. Cell Res. (in press).