

A Refined Biocrystallisation Method applied in a Pictomorphological Investigation of a Polymer

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An experimentally refined biocrystallisation method is presented. The method is applicable for investigating the pictomorphological properties of biological samples, as expressed in morphological features of crystal textures. The method is applied in medical research, and in agricultural research concerning crop quality, as a complement to chemical analyses of single compounds. The objective of the present study was to refine existing crystallisation chamber techniques through control of physical factors influencing evaporation and crystallisation. The reproducibility of the method was studied in a two-fold manner: 1) Concerning the control of physical factors variations in air temperature and humidity were studied during three similar experiments with experimental periods of 17 hours. 2) Concerning the reproducibility of textural features three investigators performed a visual classification of 32 coded crystallograms produced during the experiments, relative to a reference set of seven classes. The crystallograms were produced on the basis of aqueous solutions of the synthetic polymer PVP (Polyvinylpyrrolidone), from different polymerisation and concentration levels. Results indicated markedly improved control of air temperature and humidity conditions, relative to a previous study. Results indicated relatively high correct classification scores for all three investigators (69–75%). The correlation coefficients for the 32 observations were high ($r=0.91-0.93$). Furthermore results indicated a strong correlation between polymerisation level of PVP and morphological features.

In der vorliegenden Arbeit wird eine verbesserte Biokristallisationsmethode präsentiert. Die Methode kann für die Untersuchung der pictomorphologischen Eigenschaften, d.h. der morphologischen Charakteristika von Kristalltexturen von biologischen Proben angewendet werden. Die Methode wird in der medizinischen Forschung und in Ergänzung zu chemischen Analysen in der landwirtschaftlichen Forschung zur Qualitätsprüfung angewendet. Das Ziel der vorliegenden Untersuchung lag in der Verbesserung existierender Kristallisationskammern durch Kontrolle physikalischer Faktoren, welche die Evaporation und Kristallisation beeinflussen können. Die Reproduzierbarkeit der Methode wurde zweifach untersucht: 1) Die Kontrolle physikalischer Faktoren wurde durch Variationen der Temperatur und der Luftfeuchtigkeit in drei vergleichbaren Versuchen untersucht, die über 17 Stunden verliefen. 2) Die Reproduzierbarkeit der Kristalltexturen wurde durch Klassifikationen von 32 kodierten Kristallogrammen anhand von Referenzkristallogrammen in sieben Klassen untersucht. Die Klassifikation wurde von drei Personen vorgenommen. Die Kristallogramme wurden unter Zuhilfenahme unterschiedlicher Polymerisierungsraten und Konzentrationen von wässrigen PVP-Lösungen (Polyvinylpyrrolidon) hergestellt. Im Vergleich zu einem früheren Experiment konnte die Kontrolle der Temperatur und Luftfeuchtigkeit wesentlich verbessert werden. Die Ergebnisse zeigten eine relativ hohe positive Bestimmungsrate der Klassifikationen (69–75%) für die drei Personen. Die Korrelationskoeffizienten dieser Klassifikationen waren hoch ($r=0.91-0.93$). Die Resultate wiesen ferner auf eine starke Beziehung der PVP-Polymerisierungsrate und der morphologischen Charakteristika der Kristalltextur hin.

Zur analytischen Bearbeitung der Tropfenbilder

Natasha Bodrova, Nikita Iroshnikov, Georg Unger

In this article we discuss the first approach to analysing so called drop pictures using computer methods. A transformation of the pictures on Fourier-Bessel spectra was implemented with the aid of original programs. These spectra are compared using standard statistical methods. Gradual back transformation of the pictures allows for detection of details that have distinct spectral characteristics.

Über die Zusammenordnung der Weltanzueheit in der Physis – Zum Erkenntnisnisanliegen von Friedrich A. Kipp (17.3.1908–30.6.1997)

Stephan Stockmar

Friedrich Kipp's involvement with cognition is characterised, based on his publications as well as many notes on his lectures and our conversations together over nearly twenty years. In addition, I was able to consult his extensive hand-written notes which often comprised collections of citations, especially from Goethe. This necessarily means that some of the citations made here are from unpublished sources. Nevertheless, the fragments comprehended and interpreted by me combined with published material are mutually supportive, especially as many themes are referred to repeatedly. Indeed, I restrict myself here to a few central themes. As it is possible to discern a *single* point of view throughout the most varied of issues, we can perhaps get a first impression of how Kipp dealt with questions of colour theory, of botany and even of the history of civilisation. His close relationship with Goethe, whose comprehensive world outlook constantly accompanied him, is mainly expressed only indirectly. This would require a separate treatment which unfortunately would not be able to draw on much published material.

Die folgende Charakterisierung des Erkenntnisnisanliegens von Friedrich Kipp gründet einerseits auf seinen Veröffentlichungen, zum anderen auf meinen eigenen Gesprächsnotizen und Vortragsmitschriften aus den letzten knapp zwanzig Jahren. Darüber hinaus durfte ich in seine zahlreichen handschriftlichen Notizen, bei denen es sich oftmals um Zitatsammlungen insbesondere von Goethe handelt, Einblick nehmen. Dies heißt aber auch, dass viele Bezugsquellen unveröffentlicht sind. Trotzdem denke ich, dass sich die von mir aufgefassten und die überlieferten Splitter im Verein mit dem Publizierten gegenseitig tragen, zumal viele Themen immer wieder und wieder angesprochen wurden. Allerdings muss ich mich auf wenige zentrale Thesen beschränken. Da jedoch bei den unterschiedlichsten Problemkreisen *eine* durchgehende Anschauungsweise deutlich wird, kann man aus dem unten Dargestellten vielleicht erahnen, wie er z.B. die Farbenlehre, botanische und sogar auch kulturgeschichtliche Fragen behandelt hat. Sein intimes Verhältnis zu Goethe, dessen umfassende Weltanschauung ihn stets begleitete, kommt meist nur indirekt zum Ausdruck. Es würde eine eigene Darstellung erfordern, die leider kaum auf Publiziertes zurückgreifen könnte.

Von der menschlichen Farbwahrnehmung zur Intentionalität

Georg Iliev

Our visual perception of an object represents several of its features which we can focus our attention upon. Since seeing is not a passive, but on the contrary an active process, two basic questions arise: What does it mean to 'see' something and what role does intentionality play in human visual perception? In order to investigate these questions, various approaches are

described, including developmental psychology, psychophysics, physiology, cognitive science and computational vision. All are related to human visual perception.

It is shown that we meet a fundamental mind-body problem even when the investigation of our visual perception is body oriented. This problem cannot be solved by applying psychophysics or by cognitive science alone. We suggest that a new concept of investigation is needed which is consciousness oriented. Thus, the different areas of science must be integrated on a higher level of organisation which again is intentional in character.

The influence of a number of factors determining our mental relation to a visible object has been demonstrated. Some aspects of Rudolf Steiner's theory of the development of consciousness are discussed. They are illuminated in a novel way on the basis of the considerations in this paper.

Beitrag zur Untersuchung der Postulate der Speziellen Relativitätstheorie von Albert Einstein

Mario Matthijsen

An immanent-critical methodology for scientifically testing existing theories is presented and applied to the postulates of Albert Einstein's Special Theory of Relativity as far as it concerns the consistency of the concepts originally introduced by Einstein himself. The analysis of these postulates leads to two problems: 1. the application of the original Relativity-Postulate to the empirical fact of the constancy of the (vacuum) velocity of light relative to a certain inertial system does not, as Einstein claims, always give rise to the same value when measuring the (vacuum) velocity of light from several inertial systems; 2. the units of velocity in two inertial systems have to be equal to each other when the relative velocity of these systems to each other is measured, whereas they have to be unequal to each other when the (vacuum) velocity of light (of the same beam) is measured. The first problem is not solvable with a modification of the original Relativity-Postulate, but only with an extra (for Einstein implicit) Postulate: when measuring the (vacuum) velocity of a ray of light from different inertial systems the numerical value must always be the same. The second problem is only solvable with an additional Interaction-Postulate. In theory this results in the units of velocity in both cases being different. But this implies a hypothesis which is in principle unverifiable (and unfalsifiable) thus contradicting the basic presupposition that the Theory of Relativity is an empirical theory. On the basis of this analysis, Einstein's approach to knowledge (as far as it concerns these postulates) is briefly characterised and we present an immanent solution to the contradictions by eliminating the extra postulate (thereby rendering the Interaction-Postulate superfluous), notwithstanding the fact that Einstein needed only some of the consequences of the extra postulate.