Optical Illusions and the Visual Arts by Ronald G. Carraher and Jacqueline B. Thurston (review)

Richard L. Gregory

Leonardo, Volume 1, Number 1, January 1968, pp. 90-91 (Review)

Published by The MIT Press

and others who, to use Gibson's words, 'want to look for themselves.'

Gerald Oster,
Polytechnic Institute of Brooklyn,
Brooklyn, N.Y.,
U.S.A.

Symétrie et Mathématique Moderne. Hermann Weyl, Nouvelle bibliothèque scientifique dirigée par Fernand Braudel. Editions Flammarion, Paris, 1964). Traduit de l'anglais. 154 pp., illus., 23 F.

Voilà un livre d'une qualité rare: il fera les délices aussi bien des artistes que des scientifiques et des humanistes en même temps qu'il les obligera à réfléchir à ce Principe de Symétrie qui gouverne tant de phénomènes naturels et illumine tant de créations artistiques.

Cet ouvrage est formé par la réunion de quatre conférences données par Hermann Weyl, à l'Université de Princeton, en 1951. Leur texte a été légèrement remanié et complété par deux courts appendices dont la lecture suppose quelques connaissances mathématiques alors que les quatre chapitres proprement dits sont à la portée du public cultivé n'ayant pas de formation mathématique. L'auteur est un physicien théoricien éminent qui a su, grâce à sa profonde compréhension de la mathématique, prolonger de manière magistrale la Théorie de la Relativité Générale, d'Einstein.

Quoi de plus simple et de plus pauvre, en apparence, que la Symétrie? Hermann Weyl nous la présente pour commencer sous ses formes les plus intuitives—qui sont aussi les plus vagues—dans ses différentes incarnations géométriques, c'est-à-dire dans l'espace: le corps humain, un objet et son image dans un miroir, un cristal de neige, les alvéoles des abeilles, les fleurs, les coquillages, une grecque, une arabesque, le baptistère de Pise, une mosaïque de Palerme. Il fixe sa réflexion sur un cas particulier important, la symétrie bilatérale, et lui donne un sens à la fois plus concret et plus précis. Il s'élève alors de chapitre en chapitre, tantôt en enrichissant et en compliquant la notion initiale, tantôt, au contraire, en la dépouillant de toute réalité pour saisir—et nous faire saisir—sa nature interne et profonde qui relève de la pure abstraction mathématique.

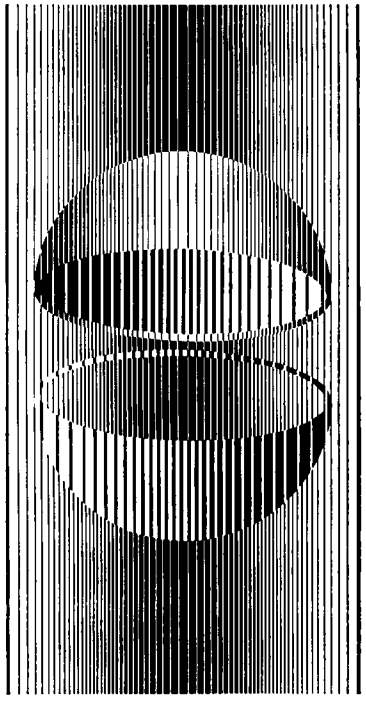
Bien sûr, au fur et à mesure de cette ascension, la symétrie perd ses capacités d'émotions sensorielles. Mais elle atteint un pouvoir d'unification qui, pour le mathématicien au moins, est, à sa maniére, une source d'émotions rationnelles.

Le texte est d'une simplicité et d'une clarté admirables. Il est accompagné de 72 illustrations dont la plupart seraient parfaitement à leur place dans des Histoires de l'Art et quelques-unes dans des ouvrages d'histoire naturelle. C'est un ouvrage qui devrait se trouver dans la bibliothèque de tout homme passionné de culture, d'art et d'esthétique. Il aurait rempli d'enthousiasme le patron de cette revue, le grand Leonardo.

F. Le Lionnais,
Boulogne sur Seine,
France.

Optical Illusions and the Visual Arts. Ronald G. Carraher and Jacqueline B. Thurston, Reinhold, New York, 1966. 127 pp., illus., $7.50.

This book, described as 'a creative guide for artists, designers, photographers, teachers, and students,' consists of over 100 illustrations and



'*Conics.*' *Serigraph by Ronald G. Carraher,* 1965.

'Fascination with this form is related to gradient patterns and the role such unit structures have in creating an illusion of the third dimension. A bowl shape within a system of graduated lines is inverted and reversed to suggest both a solid and a void.' (From *Optical Illusions and the Visual Arts.*)

virtually no text. The illustrations are well printed in black and white. They include examples of the traditional distortion illusions; Op Art pictures, notably ones by Bridget Riley and V. Vasarely with various repeated line effects; ambiguous figures open to alternative perceptual interpretations, reaching the greatest sophistication in the work of M. C. Escher, represented by one example; and numerous very striking commercial designs. Among the more interesting examples are normal photographs, especially one of contour ploughing in which the curved parallel lines seem to undulate above the field and off the page of the book.

The authors' intention was evidently to produce a portmanteau of visual effects for the benefit of artists and designers; the book is not aimed at scientists interested in the reasons for disturbances

of the visual system. Explanations are not attempted, and no references are given to the experimental literature, which is in fact large and in places worthy of consideration. The lack of text is unfortunate, for there is a strong current movement in art schools to consider the underlying processes of visual perception, and not to be content simply with learning in an *ad hoc* manner which techniques and tricks of the trade can produce various effects. There is indeed some return to the Renaissance attempt to understand the techniques of art in physical and biological terms, which we find in Leonardo's notebooks and which could surely be greatly extended with present knowledge of physiological optics. The modern founder of physiological optics, Hermann von Helmholtz, himself wrote some too-little-known essays on the subject a century ago. The present book does not reflect the current intellectual interest in art or help the student to understand what he is doing when he titillates the eye to divert the mind.

Nevertheless, it is a nice collection of examples and well produced. No text is better than a poor one—provided the total absence of explanation does not lead students to assume, wrongly, that visual illusions are necessarily beyond the province of scientific explanation.

Is this book of interest to artists? It has many suggestive examples of successful effects, but it does not give general principles which allow new ideas to be generated. It does not discuss the possible significance, or triviality, of Op Art. There remains the need for a book which presents psychological and physiological perceptual principles with advice on how to play upon these mechanisms to obtain particular effects, and so enrich the armoury of the artist. Science could make quite dramatic contributions to fine art, as to architecture, and it is time artists took advantage of the exciting possibilities provided by a more scientific approach to art's techniques.

Richard L. Gregory,
Physiological Laboratory,
University of Cambridge,
Cambridge,
England.

Symmetry Aspects of M. C. Escher's Periodic Drawings. Caroline H. Macgillavry, A. Oosthoek's Uitgeversmaatschappij N.V., Utrecht, for the International Union of Crystallography. Illus., $10.

The professor of chemical crystallography at the University of Amsterdam has organized this unique and beautiful book from the corpus of marvelous space-filling periodic drawings made over two decades by the artist Maurits C. Escher. Adding a few specially drawn for this work, Escher has here given us the classical crystal groups in the plane, and a good many more that exploit the latest extensions to color symmetry, foreseen by the artist before mathematicians had officially recognised and classified them. Here are 40 plates: fishes, knights, tadpoles, blossoms, starfish, angels and demons, all marching conformably to the laws of the crystal group, most in eye-filling color. A supplementary text page describes and points out what is noteworthy in each example for the student of crystallography. Tracing and translating the pattern skeleton for each example will be a royal road for undergraduate students and a joy for artists, indeed for all who have eyes to see and minds to delight at the bounty of symmetry. The fivefold violet flowers arranged in a threefold pattern among green leaves are an unforgettable sermon against the pentagonal crystal. Only the motion picture screen might do it better.

Scientific American.

Textures: A Photographic Album for Artists and Designers. Phil Brodatz, Dover Publications, New York, 1966. xiv + 112 pp., illus., $2.25.

This is a wonderful idea—a collection of some 112 striking black-and-white photographs of some of the myriad fascinating textures and patterns found in nature. The photographer who had the idea is first-rate, his selection of what to photograph (although there's always room for disagreement here) good, and the large-format (7·75 × 10·5 in.) book Dover has produced, handsome.

What more could anyone ask for? Perhaps that all the photographs be free for reproduction as backgrounds? Even that wish has been granted. The result is a volume that is likely to be treasured by artists, and particularly commercial artists and designers, for years to come.

This is not to say that the book will not be of interest even to the casual browser, because it will. The patterns and textures nature produces are fascinating enough to intrigue almost anyone, and Brodatz has admirably achieved his objective of producing 'photographs with depth, with highlights and shadows that would give a deep-textured effect which, if successful, would make one want to reach out and touch the print.'

If one had any complaints about the book, it would be that the photographer has been relatively unimaginative and concentrated on a rather small number of things to photograph. He seems, for example, to be intrigued with the textures of fur and animal skin. He has provided six different photos of European marble, and five shots of brick walls. Only in a few photos—two of dried hop flowers, a shadowgraph of Japanese rice paper which looks exactly like a Jackson Pollock, a shot of woven brass mesh in which the focus is on its shadow—does he really exercise his imagination.

However, there's little doubt that this beautiful book is only Volume 1 of what should be, and undoubtedly will be, a continuing project. Hopefully, more diverse and more imaginative subjects will be included in forthcoming volumes.