

BOOK REVIEWS

Nothing and Non-existence—The Transcendence of Science by W. B. Turner, (Published by Philosophical Library Inc., 200, West 57th Street, New York 10019, USA), 1986, pp. 414. Price: \$27.50.

"Nothing" in Science

Nothing is the smallest of all things: and yet it is the prelude to everything that is, including the largest, the Universe. It is the beginning of all that exists. It is the basis, the fundament of everything. Without Nothing, there cannot be Something. If Something has to be, it must take its origin in Nothing. If we wish to know anything at all, we must know about Nothing.

This is the main argument of a remarkable book by William B. Turner, perhaps the first of its kind published in the West.

"What is the most dominant area of inquiry in Science", asks Turner: and he answers: "It is the concept of Nothing". Interestingly, it is also the leading area of exploration in philosophy as well as in religion. For, both these want to get to the beginnings.

It is singular that western science or even western philosophy has failed to address itself to this problem. Concentrating as they both do on substance, tangibility and concreteness, Nothing offered to them very little of consequence for investigation and scrutiny. Indeed, western science did not comprehend the concept of Zero until it was introduced by the Hindu numeral system.

It is significant that alone among the sciences, Mathematics it was that first recognized the significance of Nothing; but even so, it was a long time before it came to be employed in a deductive manner.

"Nothing" in Theology and Religion

It was however theology and religion that first expressed interest in Nothing. Most religions admit to the concept of an initial creation and that before creation, there was Nothing. Indeed, the Creation hymn of the Rig Veda (X : 129) ranks as a seminal and inspiring donation to the world, which has been continually dazzled by the intuitive incandescence of these words: "There was neither Existence nor Non-existence".

Does this mean there was Nothing? For Turner, Yes. But more of it later. However that may be, the Rig Vedic hymn admits to the root of Existence

being in the Non-existent. Turner endorses this enthusiastically.

Nothing, Non-existence and Existence:

The central point of interest in Nothing is that something comes out of it. But how ? Turner makes an important point here. He posits the presence of an entity, an elementary unit, between Nothing and Existence. Nothing by itself may or may not lead to Existence. Nothing is the equivalent of Absolute Zero, and essentially has no future, with special reference to Existence. When Existence is planned (who plans ?), Nothing changes and becomes Non-existence. This change from " Nothing to Non-existence" may be small but it is significant. The former may or may not give rise to Existence; the latter's destiny lies irrevocably in Existence.

Why, one may ask, does Something come into Existence ? Why, in effect, does not Nothing continue to be Nothing ? The reason lies in the inherent inability of Nothing to remain long as Nothing. It has the seeds of change into Something. Indeed, the very origin of Something should be sought in this ability of Nothing to give rise to change, —a profound philosophical concept.

Nothing and Something

The striking significance of Nothing is no more brilliantly illustrated than by Lao-tse, the Chinese philosopher, 2500 years ago, by his examples of the room and the bottle. The walls of the room enclose nothing but it is this nothing that holds, and can contain something. So is the bottle; it may be made of any convenient material—glass, clay,—but the space inside it, the Nothing, is meant to hold something.

The Hindu sages went further; they not only were aware that Nothing *held* Something but were able to perceive that Something *came out* of Nothing. The Rig Veda found "The root of Existence in the Non-existent".

One of the things Turner's book sets out to do is to make the distinction between Nothing and Non-existence. Far from the general notion of the two being identical, Turner makes non-existence an interface between Nothing and Existence. Nothing cannot give rise to Existence except through this interface.

The abiding interest in Nothing and Non-existence lies not only in themselves but in that they give

origin to something. And the greatest Something is the Universe. The creation of the universe is the most important of all events. In this again, the "Moment of Creation" is critical; it is the formal beginning, it is the boundary between Non-existence and Existence, the great divide between the two.

Creation and Materialization

In a discussion of Nothing, the most important topic is the materialization of substance. Creation of Something out of Nothing has always been the central problem. Scientists are concerned with it as much as philosophers have been, also men of religion. For, they all are interested in the beginning of things. The "Big Bang" theory of the origin of the universe presumes the existence and availability of a mass. But where did this mass come from? Ever since Tertullian's great debate with Praxeas, Creation has been understood as Creation *ex nihilo*. On the other hand, Aristotle's formulation of his doctrine of Creation involving the four causes, assumes not only the presence of initial stuff but also of the Maker.

That the origin of things—of the Universe, of Matter, of Life, of Change and Movement, even of the Mind and the Senses—was a subject of intense and serious inquiry of the Hindu sages and philosophers, is time and again clear as one acquaints oneself with the Hindu texts. The opening verses of both the Kena and Swetaswatara Upanishads raise these fundamental questions. Of the six pupils of the sage Pippalada who approach their teacher with their problems (The Prashna Upanishad) the first and the keenest, Kabandhi Katyayana, poses the palmary question: "Whence Creation"?

That Science more recently is also seized of this problem is evident from this seminal book. Turner goes beyond the Upanishadic inquiry and demonstrates that science has the ability to analyse the circumstance as well as the structure of conditions attendant on the primal origins of Something from Nothing. This is the grand role of Science.

Creation, Energy, Substance

Turner's book does not claim to answer all questions relating to origins. It does not, for example, deal with the question of energy requirements at the time of, and involving, Existence. Turner would be the first to admit that any hypothesis of origins of Existence would depend for its viability on the nature of energy available at the time of Creation and the circumstances of its applications. The intimate bearing between the two

cannot be denied. The acquisition of an "Outside hardness" and "Inside density" of the initial Something within the general background of Nothing and Non-existence is ultimately a matter of energy. To be sure, Turner's Something includes Energy in addition to Life and Matter but this energy is result and consequence of Existence, or if one may say so, an *outcome* of the process. So far as I could see, Turner does not deal with the energy *inputs* required for the process. However philosophically minded, a scientist like Turner cannot get away from the problem; an involvement of God or of Gods could, I suppose, be accommodated, but then it goes beyond Science.

Transcendence of Science

Turner's sub-title "The Transcendence of Science" to my mind is an admission, not so much of the inability of Science to seek the origins of Existence or the compelling necessity to go beyond science in this quest. It is, to me, a vital recognition of the inter-dependence, or better, an interplay of science and philosophy. Indeed, if I were to declare in a few words the message of Turner's book, I would unhesitatingly assert, it is the inescapable inter-dependence between Science and Philosophy in the solution of the fundamental problems of Life, Existence and Reality.

It is interesting that Turner in his final conclusion adheres to the Buddhist concept that things are illusions and that they are "neither Existent nor Non-existent". Paraphrased in the idiom of Adi Shankara, there is only one Reality, and that is Brahman.

This is an unusual book. But then William Turner is an unusual person. Educated and trained as a scientist, engineer and management expert, Turner took a degree in Divinity and seems well versed in the classics. Turner's range of ideas is so vast as to encompass a great deal of human knowledge. Indeed, one likes to think, it is this inter-disciplinary training and competence that has enabled Turner to delve so deeply into the meaning and significance of Nothing.

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Engineering Composite Materials by Bryan Harris, (Published by The Institute of Metals, 1, Carlton House Terrace, London SW1Y 5DB, U.K.), 1986, pp. 119, Price: UK £ 14, Elsewhere \$ 24.

As the author points out in the preface, the book has grown out of a series of lectures offered to materials science students at the University of Bath. The book is divided into six chapters, each containing adequate references.

The first chapter provides comprehensive introduction to composites, including the role of matrix and reinforcements in various types of composites. Elastic properties of fibre composites constitute chapter 2. Although the title is restricted to fibre composites considerable attention has been given to laminate composites. Elastic properties of multiply laminates have been treated in terms of single-ply laminates. Chapter 3 concerns with strength of composites including tensile, shear and compressive strengths. The chapter on fracture and toughness presents the matrix and fibre effects on the mechanisms of crack extension. In chapter 5 on fatigue, the author has documented very well the materials effects and test variables on the fatigue behaviour of composites. What distinguishes this book from other books on composites is inclusion of a section on short fibre composites in many chapters. This is quite significant, since in recent years there has been a revival of interest in metal matrix-short fibre composites. Chapter 6 deals with environmental effects on composites.

The appendix in the end focusses on the use of composites in a variety of applications including engineering, household and recreation (sports). It would have been more useful if the author had made this section a little more comprehensive.

On the whole, the book is well organized and a valuable addition to any library and to researchers in the field of composites. The book can also be used as a textbook for graduate level course on composite materials.

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Glossary of Fertilizers by M. R. Motsara and Joginder Singh, (Published by Agricole Publishing Academy, 208, Defence Colony Flyover, New Delhi 110 024) 1987, pp. 192, Price: Rs 200: US\$ 40.

Land resources remaining the same, increased agricultural production to meet the growing needs of the population can be achieved only through increasing the productivity of crops. It is recognised that the potential yield of crop genotypes can be achieved only when adequate plant nutrients are supplied. Fertilizers play a dominant role in supplying the required plant food ingredients to crops.

Fertilizer technology has developed considerably in the world as well as in India. The fertilizer production, quality control and efficient utilization are the aspects in which the industries, scientists, extension workers and farmers are interested. Because of sophisticated techniques of production and usage, a number of chemical and agronomical terms have been used in the profession. Frequently, these terms are not fully understood and sometimes are not appropriately utilized. This book is a valuable compilation which serves as a guide for a better and fuller understanding of fertilizer science and technology. The commonly used scientific terms are appropriately explained alphabetically. In addition to explaining the terms, further related information has been added under each item so as to make it better understandable for a person with some basic technical background. Simple chemical transformations are explained with formulae. Information on chemical formulae of fertilizer materials, methods of manufacture, their composition, and quality standards have been given.

The book is useful to scientists dealing with fertilizer manufacture, quality control, fertilizer use research, extension workers involved in fertilizer promotion, and the progressive farmers. It will also be useful to students in the Agricultural Universities of the country. It is a valuable reference book for all those engaged in the task of fertilizer promotion.

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Annual Review of Cell Biology, 1986, Vol.2, pp.559, (ed.) G.E.Palade, (Published by Annual Reviews Inc., 4139, El Camino way, Palo Alto, California 94303, USA). Price: USA \$ 31, Elsewhere \$ 34.

The second volume in the series contains 18 reviews encompassing a wide range of subjects including embryogenesis, transmembrane signalling, cell motility and protein translocation-areas of vigorous research 'action' at present. There is little doubt that the major thrust in cell biological research is the understanding of the molecular mechanisms of cell-cell regulation. In keeping with this, the first four articles which are on cell adhesion and embryogenesis review the 'state of the art' on the activation of motility by the operation of ion channels, the role of chemotactic peptides like 'speract' and 'resact' and Ca^{2+} ion fluxes across the sperm and egg plasma membranes during fertilization. In an interesting article on the transcriptionally active chromatin structure, the problem of correlating transcriptional activity *in vivo* with physical structure determined *in vitro* is discussed.

One of the 'hyperactive' regions in biochemistry today is transmembrane signal transduction *vis a vis* phosphoinositide turnover, Ca^{2+} release and protein kinase C activation. A perusal of Nishizuka's review leaves one with the feeling that a full appreciation of protein kinase C as a positive or negative amplifier of the signal should wait for the identification of the proteins the enzyme phosphorylates. Also, the relationship between protein kinase C and calcium flux is also far from clear. A summary of the functional aspects of H^+ -translocating ATPase complex is attempted in another article.

The biochemistry of the family of signal-coupling proteins called G-proteins, their role in hormonal and sensory transduction processes in eukaryotes, particularly the regulation of receptor-mediated adenylate cyclase and the challenges ahead are elegantly discussed.

The elaborate array of cytoskeletal elements consisting of microtubules, microfilaments and the proteins that bind and interact with these, called microtubule-associated proteins (MAP) are reviewed with a focus on isolation and characterization of the MAP and their role in particle movement, microtubule growth and mitosis.

Another article covered the proteins that bind to messenger RNA (mRNA) and heterogeneous RNA (hn RNA) and form RNA particles in nucleus and cytoplasm and their assembly and function. All the hn RNA have a 5'-cap structure (m^7Gppp) and

some of them acquire 3'-poly A tail and a subset of these are precursors of mRNA for translation into proteins. A set of proteins are associated with the RNA and exchange and thus participate in the selection and transport from nucleus to cytoplasm.

The salient features of transport of proteins across plasma membrane and endomembranes are discussed in three reviews. One of the authors rightly pointed out that the tools of study need to be refined for obtaining a clear definition of processing of proteins destined for export, during or after translation. Major effort is being made to define the mechanism of targeting of newly synthesized proteins to their specific cellular locations. The rapidly progressing field of regeneration of cilia and flagella, facilitated by the availability of mutants with "aberrant control of flagellar length, assembly, motion, stability and regeneration", uses such techniques effectively.

The publishers found that the field of cell biology is fast growing and needs separate coverage in addition to the related series such as biochemistry, genetics, immunology and microbiology. There is bound to be overlap in the contents and this does not reduce the utility of this separate series. These articles give an overview of the research activity in cell biology which is opening up frontiers hitherto unexplored in developmental biology, cell differentiation, immune systems, signal transduction, cell motility, and protein transport across membranes. The most important role that these articles can play is to focus attention of biologists on the molecular events that underline the cellular phenomena.

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Medicinal Plants of India, (eds) G. V. Satyavati, Ashok K. Gupta and Neeraj Tandon, (Published by Indian Council of Medical Research, Ansari Nagar, New Delhi 110 029), 1987, Vol. 2, pp. xii + 598, Price Rs. 136/-, \$33, £20.

India is well known for the use of plants in medicine. Besides the *Vedas*, the ancient scholars like *Charaka*, *Susruta*, *Vagbhata* and others brought out texts containing the descriptions of various plants used in several preparations for the

treatment of various diseases. In recent days, more and more Westerners are evincing keen interest for the plant based drugs and their preparations. Further, with the development in science and technology, a lot of work has been carried out on various aspects of medicinal plants. Hence, in order to derive the benefits of medicinal plants to the maximum, it is essential to update our knowledge. The ICMR is trying to accomplish this onerous task by publishing the book on *Medicinal Plants of India* – volume-wise.

The present volume is the second in the series of proposed three volumes and is essentially a compilation of data of published literature covering about 550 species. The volume is aptly dedicated to Dr. C. Dwarakanath who has done yeoman service to the field of Ayurveda. The plants under alphabets H to P are covered and the information is updated till 1985. Every plant is given the genus and family name. The species are provided with valid botanical name, different Indian names, distribution including the habit of the plant, part used, therapeutic properties, action and uses of the drug as mentioned in Ayurveda, and properties and uses ascribed in traditional medicine. This is followed by pharmacognostical details providing important characters of the drug, chemical, pharmacological and clinical studies. Literature consulted is provided at the end for further reference on the plant/drug. An index to botanical names, chemical constituents, pharmacological activity (with lists as per pharmacological activity) are provided separately. Further, index of names of plants in Indian regional languages and also in common English along with a short Bibliography of books consulted are provided enhancing the value of the volume.

The editors have done a commendable job covering an enormous literature; they are ably assisted by experts in the respective fields. However, some of the drawbacks noticed in the volume are the following: 1. the alternate names of certain families should have been in parenthesis; 2. a lot of confusion exists in the synonyms of botanical names; sometimes the basionyms are given as synonyms and in some places they are totally omitted (pp. 54, 80, 161, etc.); uniformity is lacking in this part; 3. the habit of the plant must be included separately and not under 'distribution'; 4. the photographs are generally good but a few like *Mallotus philippensis* must be improved; 5. the accepted source of the drug as per *The Ayurvedic Formulary of India* (Part I), Govt. of India, Ministry of Health, 1976, New Delhi should have been included under the Ayurve-

dic part; 6. it is mentioned on p. 51 that *Centella asiatica* and *Herpestis monniera* have similar properties; Usman Ali et al (*Bull. Med.-Eth. Bot. Res.* 1(4): 23, 1980) have clearly shown that they possess different therapeutic properties. This reference has escaped the notice of the editors.

Though the volume duplicates the work published in *The Wealth of India* by CSIR to some extent, it is still a valuable addition to the field of medicinal plants. It caters to the needs of all those interested in medicinal plants; the printing and get-up of the volume is good and the price is reasonable considering the volume of information.

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Opto-electronic Imaging, Proceedings of the International Symposium on Opto-electronic Imaging, (eds) D. P. Juyal P. C. Mehta and M. K. Sharma, (Published by Tata Mc-Grow Hill, 4/12, Asaf Ali Road, New Delhi 110 002), 1987, pp. 564, Price: Rs. 360/-

The book represents the proceedings of an International Symposium on Opto-electronic Imaging held in New Delhi, in December 1985. According to the editors 97 papers (invited and contributed) were scheduled for presentation. Obviously some authors didn't turn up and hence their papers do not appear in the book. It is mentioned in the preface that the papers presented at the symposium have gone through the mill of expert review and thus finally 55 papers have found place in the book. All this indicate unsparing efforts by the editors to maintain high standard of the quality of papers included in the book. For this the editors deserve all praise and credit.

The book is organized into six sections titled opto-electronic imaging (which incidentally exhausts the title of the symposium); materials, sensors and displays; design, development and evaluation; image processing; opto-electronic communication and lasers and applications. It is quite attractive in its get-up especially with an eye-catching cover; therefore kudos to Tata McGraw-Hill Publishing Company.

Opto-electronic imaging is the theme chosen for the symposium. Nowhere in the preface the editors

dwelt upon the reasons for synthesizing such an odd title using obviously incompatible but well-known terms *opto-electronics* and *imaging*. Reading through the papers a reader cannot escape getting time and again the following question in his mind. Was the symposium intended for taking stock of state-of-the-art in opto-electronics or imaging or both?

If it was meant for opto-electronics, then all the papers should have been devoted to the theory and practice of opto-electronic devices and systems. By this I mean such devices and systems in which the electronic functions are accomplished through the agency of the energy/information carrying capabilities of electrons, which in turn are generated through the mediation of light interacting with matter. On the other hand if the whole idea was to concentrate on imaging, then all the papers should have been devoted to subjects such as image formation, image processing, image transmission, image storage, image understanding etc. It is evi-

dent that the symposium was designed to cover as loosely as possible both opto-electronics and imaging. Of course the individual scientific value of a number of papers is never in doubt. But when such diverse papers are clubbed together under one omnibus title, the specialist reader will be pained while the non-specialist will remain totally confused.

The book is expensive for individuals. Where does such a book belong? Obviously in the bookshelves of the participants of the symposium and institutional libraries, where it can be displayed as one more addition to the existing collection of passive books euphemistically called reference books.

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NEWS

PUBLICATIONS FROM HERBARIUM CRYPTOGRAMAE INDIAE ORIENTALIS (HCIO)

Descriptions of Pathogenic fungi, which cause damage to the plants, in the form of sets comprising of loose leaflets have been issued by Herbarium Cryptogamae Indiae Orientalis, Division of Mycology & Plant Pathology, IARI, New Delhi for the first time. These sets provide information on fungi, their geographical distribution and frequency of occurrence in India with the help of disease distribution maps. It is a useful information for plant patholog-

ists and mycologists interested in plant disease identification. The authors have cited original Indian references pertaining to them wherever necessary. List of synonyms and basionyms of the descriptive fungus is another feature of these descriptions. These sets include genera like *Erysiphe*, *Phragmidium*, *Uromyces* and members of Aphyllophorales. The sets are reasonably priced between Rs. 15 and 20 each only.
