

PHILOSOPHICAL
TRANSACTIONS
— OF —

THE ROYAL
SOCIETY

B

BIOLOGICAL
SCIENCES

Introduction to the Philosophical Transactions B Millennium issue. A special Millennium issue edited by S. Zeki

The Royal Society

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Introduction

The moment of the Millennium is an artificial moment, devised by man to classify time and ease his thinking about past and future. It is, for all that, a genuine occasion for reflection, a moment to glance backwards in time, through the assurance of recorded history which assures us that there is little that we can be sure of; and a moment to think about the unfathomable future which, because there is so little that we can be sure of, also brings untold hope.

The Millennium and the Century to which we are bidding farewell have been permanently scarred by a hideous record of intolerance, of barbarities beyond belief and of a wickedness seemingly without end. Even as we prepare this issue for the press in the last remaining weeks of this Century, pictures flashed nightly on our television screens tell of no reprieve from atrocities that make a mockery of human life and a mockery, too, of the lessons of history. The artificial moment recording the passage of time cannot, it seems, artificially end that barbaric instinct engrained in the constitution of man. And yet, despite this painful record, mankind still has much to be proud of in the past few centuries. Their glittering achievements in all areas of human endeavour have made the world a richer, better and probably a happier place. They have also produced some of the greatest ornaments of the human race, who have immeasurably enriched our culture; many, both British and foreign, have been Fellows of The Royal Society and the signatures of some of the most illustrious amongst them appear on our cover. Many have recorded their achievements in the pages of this journal, which has served science without interruption since we began publishing in 1665, as our brief illustrated history of the journal on the following pages shows. At a time when we are beginning increasingly to apply what has been learned from the basic sciences to understanding the nature of man, it is pleasurable to record that among our past Fellows were Voltaire, Edward Gibbon, Lord Byron, John Locke, Montesquieu, Joshua Reynolds and others. Their achievements cannot be regarded as scientific in the accepted sense. But they have nevertheless explored the constitution of man and his psychological profile through the techniques of literature and of art, thus contributing profoundly to man's knowledge of himself. It is a pity that we cannot number Shakespeare, Leonardo, Michelangelo and Beethoven among them!

The past and the future are woven into the fabric of the free essays which we have asked men and women of distinction to write for this special issue. As befits the occasion, we begin with essays on the history of our planet and on the possibilities of life elsewhere in our Universe and, before ending with philosophy we publish essays on what many consider to be the future queen of the sciences in the quest for understanding the nature of man, namely neurobiology in its broadest sense. In between, the essays cover not only various areas of biology which we deem to be of importance for science and society, but also give a panorama of the economic prospects for the world, without which the fulfillment of man's dream for a millennial future through scientific and artistic endeavours would be difficult, if not impossible, to achieve. There are of course areas which we have not been able, for one reason or another, to cover in this special issue—areas such as the human genome project, the impact of human migrations, the consequences of ecological change and the threat of future pandemics. These are however topics which we intend to cover in special issues over the coming two years.

Collectively, the essays give a glimpse of the excitement of science and the joy of looking into its future from the achievements of its past. Together, they speak of a vigour and above all of an optimism that the efforts of today will bring important rewards tomorrow. It is thus a pleasure for us to end this Century with hope, that the achievements of science will benefit mankind in the future even more than they have in the past. We look forward with hope, too, to recording many of these future achievements in the pages of this journal, as we have for the past 335 years, so that in the words of the Introduction to our first issue in 1665, 'those addicted to and conversant in such matters, may be invited and encouraged, to search, try, and find out new things, impart their knowledge to one another, and contribute what they can to the Grand design of improving Natural Knowledge, and perfecting all Philosophical Arts, and Sciences, All for the ... Universal Good of Mankind'.

October 1999

Semir Zeki,
Editor

In the following few pages we record pictorially the history of the *Philosophical Transactions of The Royal Society*, beginning with the Minutes of the Meeting of Council on 1 March 1664 that established the journal. This is followed by the Epistle Dedicatory written for the first issue in 1665 by Henry Oldenburg, who was then a Secretary of The Royal Society, and who had proposed Leibniz for election to the Fellowship (Leibniz was elected a Fellow of The Royal Society on April 9, 1673). Also reproduced is the Table of Contents together with a replica of the Introduction to the first issue, and the first pages of articles published in our issues of January 1700, January 1800, and a chosen manuscript from one of the 1900 issues (the *Transactions* did not appear in January that year).

The *Philosophical Transactions of The Royal Society* was separated into two parts in 1887, part A dealing with the physical sciences and part B with the biological sciences.

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March. 1. 1664.

The Council met. present,
 Lord Brouncker. D.^r Clark.
 S.^r Rob.^t Moray. M.^r Palmer.
 S.^r Paul Neile. M.^r Colwall
 M.^r Aerskins. M.^r Oldenburg.
 D.^r Wilkins.

Ordered, that foure or five hundred Tickets
 be printed for demanding the Arrears of the Fellows
 of the Society, leaving Blanks for the Time and
 the Respective Sums.

Ordered, That the Philosophical Transactions
 to be composed by M.^r Oldenburg, be printed the
 first Munday of Every month, if he have
 sufficient matter for it, and that that Tract
 be licensed by the Council of the Society, being
 first reviewed by some of the Members of the
 same.

And that the President be Desired, now
 to Licence the first papers thereof, being written
 in four Sheets in folio, to be printed by John
 Martin and James Allestree.

T O T H E
Royal Society.



I will not become me, to adde any Attributes to a Title, which has a Fulness of Lustre from his Majesties Denomination.

In these Rude Collections, which are onely the Gleanings of my private diversions in broken hours, it may appear, that many Minds and Hands are in many places industriously employed, under Your Countenance and by Your Example, in the pursuit of those Excellent Ends, which belong to Your Heroical Undertakings.

Some of these are but the Intimations of large Compilements. And some Eminent Members of Your Society, have obliged the Learned World with Incomparable Volumes, which are not herein mention'd, because they were finisht, and in great Reputation abroad, before I entred upon this Taske. And no small Number are at present engaged for those weighty Productions,
which

Epistle Dedicatory.

which require both Time and Assistance, for their due Maturity. So that no man can from these Glimpses of Light take any just Measure of Your Performances, or of Your Prosecutions; but every man may perhaps receive some benefit from these Parcels, which I guessed to be somewhat conformable to Your Design.

This is my Solicitude, That, as I ought not to be unfaithful to those Counsels you have committed to my Trust, so also that I may not altogether waste any minutes of the leasure you afford me. And thus have I made the best use of some of them, that I could devise; To spread abroad Encouragements, Inquiries, Directions, and Patterns, that may animate, and draw on Universal Assistances.

The Great God prosper You in the Noble Engagement of Dispersing the true Lustre of his Glorious Works, and the Happy Inventions of obliging Men all over the World, to the General Benefit of Mankind: So wishes with real Affections,

Your humble and obedient Servant

HENRY OLDENBURG.

(1)

Numb. 1.

PHILOSOPHICAL TRANSACTIONS.

Munday, March 6. 1664.

The Contents.

An Introduction to this Tract. An Account of the Improvement of Optick Glasses at Rome. Of the Observation made in England, of a Spot in one of the Belts of the Planet Jupiter. Of the motion of the late Comet predicted. The Heads of many New Observations and Experiments, in order to an Experimental History of Cold; together with some Thermometrical Discourses and Experiments. A Relation of a very odd Monstrous Calf. Of a peculiar Lead-Ore in Germany, very useful for Essays. Of an Hungarian Bolus, of the same effect with the Bolus Armenus. Of the New American Whale-fishing about the Bermudas. A Narrative concerning the success of the Pendulum-watches at Sea for the Longitudes; and the Grant of a Patent thereupon. A Catalogue of the Philosophical Books published by Monsieur de Fermat, Counsellour at Tholouse, lately dead.

The Introduction.

WHEREAS there is nothing more necessary for promoting the improvement of Philosophical Matters, than the communicating to such, as apply their Studies and Endeavours that way, such things as are discovered or put in practise by others; it is therefore thought fit to employ the *Press*, as the most proper way to gratifie those, whose engagement in such Studies, and delight in the advancement of Learning and profitable Discoveries, doth entitle them to the knowledge of what this Kingdom, or other parts of the World, do, from time to time, afford, as well of the progress of the Studies, Labours, and attempts of the Curious and learned in things of this kind, as of their compleat Discoveries and performances: To the end, that such Productions being clearly and truly communicated, desires after solid and usefull knowledge may be further entertained, ingenious Endeavours and Undertakings cherished, and those, addicted to and conversant in such matters, may be invited and encouraged to search, try, and find out new things, impart their knowledge to one another, and contribute what they can to the Grand design of improving Natural knowledge, and perfecting all *Philosophical Arts, and Sciences*. All for the Glory of God, the Honour and Advantage of these Kingdoms, and the Universal Good of Mankind.

II. *Part of a Letter from Mr Antony van Leu-
enhoek, F. R. S. dated at Delft in Holland,
Sept. 25. 1699. concerning the Circulation
and Stagnation of the Blood in Tadpoles.*

IN the beginning of *May* last I saw in a Moat of a friends Country-house, a great many little Tadpoles, that change into Frogs ; and when some learned men of this Country sent me word, that if it did consist with my conveniency, they had a mind to come and give me a visit ; I did agree to it, but was afraid that I should not procure any of these Tadpoles, because it was then late in *June* ; to shew these Gentlemen the circulation of the Blood (which all learned men dive into) and that the more, because these Tadpoles are apt to lye quieter than Eels, and secondly because one may more exactly discern the Arteries from the Veins in them than in any other Animal, and then because even in the smallest or thinnest Veins one may see the red globules of the Blood run further asunder.

These Tadpoles were of several sizes, for the biggest of them were arrived to such a magnitude, that their hindmost Legs began to stick out from their bodies ; the smallest of them were no bigger, than that thirty of them together made but the bigness of one great one : From whence we must conclude, that the Frogs lay their Eggs but very slowly, for then it was already about a month's time agonè that I had made my observations about them, when there was some amongst them that I judged to be half grown.

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VII. *Outlines of Experiments and Inquiries respecting Sound and Light.* By Thomas Young, M. D. F. R. S. In a Letter to Edward Whitaker Gray, M. D. Sec. R. S.

Read January 16, 1800.

DEAR SIR,

It has long been my intention to lay before the Royal Society a few observations on the subject of sound ; and I have endeavoured to collect as much information, and to make as many experiments, connected with this inquiry, as circumstances enabled me to do ; but, the further I have proceeded, the more widely the prospect of what lay before me has been extended ; and, as I find that the investigation, in all its magnitude, will occupy the leisure hours of some years, or perhaps of a life, I am determined, in the mean time, lest any unforeseen circumstances should prevent my continuing the pursuit, to submit to the Society some conclusions which I have already formed from the results of various experiments. Their subjects are, I. The measurement of the quantity of air discharged through an aperture. II. The determination of the direction and velocity of a stream of air proceeding from an orifice. III. Ocular evidence of the nature of sound. IV. The velocity of sound. V. Sonorous cavities. VI. The degree of divergence of sound. VII. The decay of sound. VIII. The harmonic sounds of pipes. IX. The vibrations of different elastic fluids. X. The analogy between light and sound. XI. The coalescence of musical sounds.

VII. *The Exact Histological Localisation of the Visual Area of the Human Cerebral Cortex.*

By JOSEPH SHAW BOLTON, *B.Sc., M.D., B.S. (Lond.)*.

Communicated by Dr. MOTT, F.R.S.

Received May 11,—Read June 14, 1900.

[PLATES 9–11.]

INTRODUCTION.

THE object of the present paper is to define by histological methods the exact limitations of the visuo-sensory area of the human cortex cerebri. The investigation to be described has occupied upwards of three years. It was commenced during the summer of 1896 in the pathological laboratory of the County Asylum, Rainhill, Lancashire; it was continued during the next three years in the physiological laboratory of Mason University College, Birmingham; and it has been completed in the pathological laboratory of the London County Council at Claybury. Owing to the remarkable facilities for research granted to workers in the last-named laboratory, it has been possible to bring this investigation to a much more rapid conclusion than would otherwise have been possible.

A general summary of the paper follows this introduction, and it is succeeded for convenience of reference by a list of the sections into which the paper is divided.

GENERAL SUMMARY.

Previous Research.

The previous research concerning the human visual area has been carried out in three directions.

- (1) The study of lesions causing blindness.
- (2) The study of the myelination of the corona radiata.
- (3) The histological examination of "occipital" or "calcarine" cortex as regards—
 - (a) Cell form.
 - (b) Subdivision of this variety of cortex into layers.
 - (c) The modifications caused in (a) and (b) by long-standing blindness.

17.11.1900