

謝 辞

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内裏表紙挿絵：Eric Kandel (for Hippocrates Quotation), Richard Morris。

裏表紙挿絵および言葉：Jennifer Altman, David Concar, Spike Gerrell。

英国神経科学協会は、非営利組織であり、慈善団体 No. 264450 に登録されている。
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参考図書

科学および神経科学に関して更に続けて読むために、多くの魅力的な書物が存在する。その中の二・三冊のリストである。



V.S. Ramachandran, (Sandra Blakeslee) **Phantoms in the Brain: Human Nature and the Architecture of the Mind**
Fourth Dimension Publications
(Paperback - 6 May, 1999) ISBN: 1857028953
A fascinating account of phantom-limb pain and related disorders of the nervous system.



Oliver Sacks, **The Man Who Mistook His Wife for a Hat** (Picador)
Picador
(Paperback - 7 November, 1986) ISBN: 0330294911
An amusing and well-written account of the effects of brain damage on the mind.



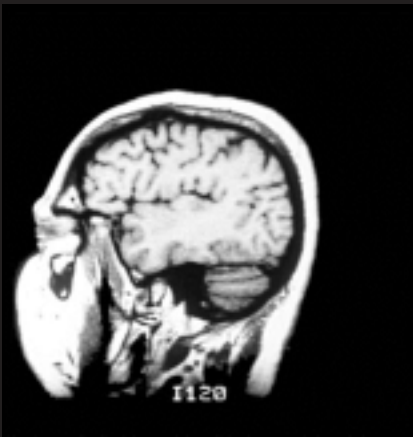
Jean-Dominique Bauby, **The Diving-bell and the Butterfly**
Fourth Estate
(Paperback - 7 May, 2002) ISBN: 0007139845
A very personal and moving account of the consequences of a stroke.



Richard P. Feynman, **Surely You're Joking, Mr Feynman: Adventures of a Curious Character**
Paperback
19 November, 1992 ISBN: 009917331X
Physicist, bongo-drum man, and all round polymath. A hero for all young scientists.



Nancy Rothwell, **Who Wants to Be a Scientist?: Choosing Science as a Career**
Smudge (Illustrator) Cambridge University Press
(Paperback - 19 September, 2002) ISBN: 0521520924
Sound practical advice on choosing science as a career.



“人は、脳から、唯一、脳だけから、私たちの悲しみ、痛み、嘆きや恐れのみならず、私たちの楽しみ、喜び、笑い、冗談などが引き起こされることを知るべきである。それを、考えなさい。特に、私たちは、見たり、聞いたり、そして美と醜を、前と悪を、快感と不快感とを識別したりすることを考える”

ヒポクラテス 5世紀 B.C.



経済的支援

この事業は、英国神経科学協会、優れた薬品開発に対する神経学およびGIセンター、グラクソ-スミスクライン、そしてエディンバラ大学神経科学センターによって支援されている。著者に対しては、その寛大な支援に感謝する。



INTO THE BRAIN

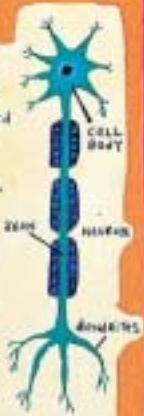
CEREBRAL CORTEX

A THIN SHEET OF NEURONS WHICH RECEIVES PERCEPTION AND SIMILAR THOUGHT. IT STORES INFORMATION AND GENERATES PLANS OF ACTION. IF ALL ITS FALDS WERE UNRAILED IT WOULD HAVE THE LENGTH OF A TENNIS COURT.

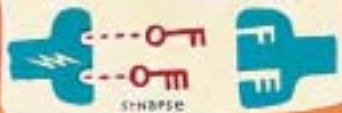


CELLS AND SYNAPSES

THE HUMAN BRAIN CONTAINS ABOUT 10¹¹ NEURONS - MORE CELLS THAN STARS ARE STARS IN THE MILKY WAY - LINKED INTO STRUCTURES THAT CAN STORE AND PROCESS INFORMATION. NEURONS TAKE INFORMATION AND SEND ELECTRICAL PULSES DOWN LONG FIBRES CALLED AXONS, CARRYING SUBSTANCES KNOWN AS NEUROTRANSMITTERS TO BE RELEASED AT TINY JUNCTIONS - SYNAPSES. DIFFERENT NEUROTRANSMITTERS STIMULATE NEURONS IN DIFFERENT WAYS.



NOT ALL BRAIN CELLS ACT BY EXCHANGING EXISTING NEUROTRANSMITTERS.



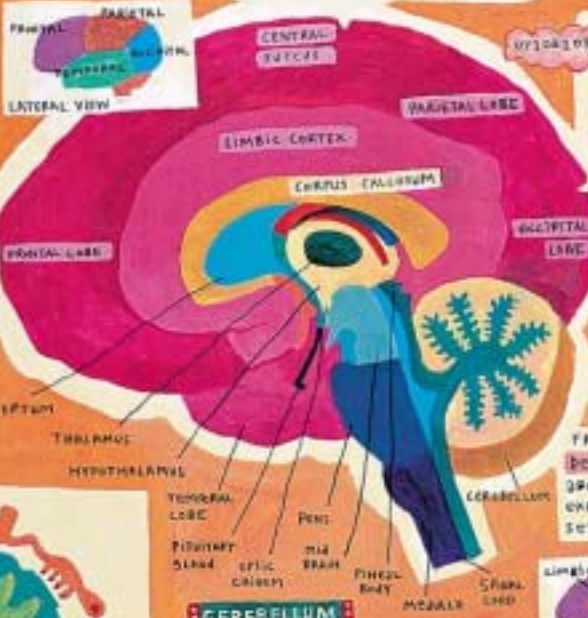
VISION: VISUAL MESSAGE FLOW OUT OF EIGHT SENSITIVE LENS IN THE RETINA AT THE BACK OF THE EYE, ALONG THE OPTIC NERVE, AND ARE RECEIVED IN A SPECIAL VISUAL CENTRE AT THE BACK OF THE BRAIN - THE PRIMARY VISUAL CORTIX.

THE VISUAL SYSTEM CONSTRUCTS THE IMAGE OF THE WORLD BY PROCESSING INFORMATION ABOUT ITS SHAPE, COLOUR, AND DEPTH IN SEPARATE PATHWAYS. THE BRAIN HAS 2 VISUAL PATHWAYS WHICH HANDLE INFORMATION ABOUT MOVING OBJECTS.



SOMATOSENSORY CORTEX

PERCEIVES SENSATIONS OF TOUCH AND PAIN. TOUCH SENSATIONS FROM DIFFERENT PARTS OF THE BODY ARE REPRESENTED IN DIFFERENT AREAS OF THE SOMATOSENSORY CORTEX AS A 'HOMUNCULUS' (LITTLE MAN). ALL PROPORTIONS OF THE SENSITIVITY OF THE BODY PARTS.



MEMORY



MEMORY IS A COLLECTION OF DIVERSE TALENTS - FACTS, EVENTS, FACES, SKILLS. EACH FORM SEEMS TO BE LOCATED IN A DIFFERENT BRAIN AREA - WORKING MEMORY ENABLES US TO HOLD FLEETING MATERIAL IN OUR HEADS FOR DOING COMPLEX TASKS LIKE BUILDING AND UNDERSTANDING SENTENCES. THE FRONTAL LOBES ARE ESSENTIAL.

DECLARATIVE MEMORY IS KNOWLEDGE ABOUT LANGUAGE, THE WORLD, PAST EXPERIENCE... AND HOW TO DO THINGS. SETTING IT UP REQUIRES THE HIPPOCAMPUS (AND OTHER LIMBIC STRUCTURES) BUT THE FACTS SEEM TO BE HELD IN THE CORTIX.

CEREBELLUM

CONTROLS MOVEMENT AND POSTURE BY ADJUSTING THE OUTPUT OF THE MOTOR SYSTEM. IT IS INVOLVED IN EYE MOVEMENTS, IN PLANNING LINGUISTIC MOVEMENTS AND IN LEARNING MOTOR SKILLS.



MOVEMENT



THE MOTOR CORTIX PLANS ALL OUR MOVEMENTS. IT COMMUNICATES WITH THE CEREBELLUM TO FINE-TUNE MOVEMENT AND WITH THE MYSTERIOUS BASAL GANGLIA. ONE OF THE BASAL GANGLIA MAY BE TO ARRANGE THE ORDER IN WHICH WE MAKE SEQUENCES OF MOVEMENTS. TO MAINTAIN POSTURE, MESSAGES FROM THE SKIN, MUSCLES, INNER EAR AND EYES ARE ALL COMBINED IN THE BRAIN STEM. THE MOTOR CORTIX COORDINATES THE OPERATION.

BASAL GANGLIA

A POORLY UNDERSTOOD COMPLEX OF CENTRES WITH MULTIPLE CONNECTIONS TO THE CORTIX AND LIMBIC SYSTEM. IT IS INVOLVED IN SKILLED MOTOR RESPONSES AND MAKING THE BRAIN FEEL GOOD.



ADAPTED FROM 'THE SECRET LIFE OF THE BRAIN' PUBLISHED BY NEW SCIENTIST.

NEW SCIENTIST.

SPIKE GERRELL.