THOMAS YOUNG

THE MAN WHO KNEW EVERYTHING

Andrew Robinson marvels at the brain power and breadth of knowledge of the 18th-century polymath Thomas Young. He examines his relationship with his contemporaries, particularly with the French Egyptologist Champollion, and how he has been viewed subsequently by historians.

'Fortunate Newton, happy childhood of science!' Albert Einstein wrote in 1931 in his foreword to the fourth edition of Newton's influential treatise *Opticks*, originally published in 1704.

> Nature to him was an open book, whose letters he could read without effort. ... Reflection, refraction, the formation of images by lenses, the mode of operation of the eye, the spectral decomposition and recomposition of the different kinds of light, the invention of the reflecting telescope, the first foundations of colour theory, the elementary theory of the rainbow pass by us in procession, and finally come his observations of the colours of thin films as the origin of the next great theoretical advance, which had to await, over a hundred years, the coming of Thomas Young.

Everyone who studies physics at school is taught that Thomas Young (1773-1829) was the English scientist who first demonstrated – with a candle, a pair of narrow slits and a white screen – that light was a wave, thus disproving Newton's conviction that it consisted of a stream of particles. Equally, anyone who studies ancient Egypt will know that Young was the linguist and antiquarian who 'cracked' the two Egyptian scripts on the Rosetta Stone, which then launched the full decipherment of the Egyptian hieroglyphs by Jean-François Champollion in the 1820s.

Young was the first to show that demotic to some extent resembled hieroglyphic visually, hence demotic was derived from hieroglyphic, and demotic was not an alphabet like the Greek alphabet on the Rosetta Stone but rather a mixture of phonetic signs and hieroglyphic signs. This thinking led Young to suggest that hieroglyphic, too, might contain some phonetic elements, an 'alphabet', for spelling non-Egyptian names like Ptolemy and Cleopatra. Less well known is that Young was a physiologist who was the first to explain how the human eye focuses on objects at varying distances; who discovered the phenomenon of astigmatism; and who in 1801 proposed the three-colour theory of vision, finally confirmed experimentally in 1959.

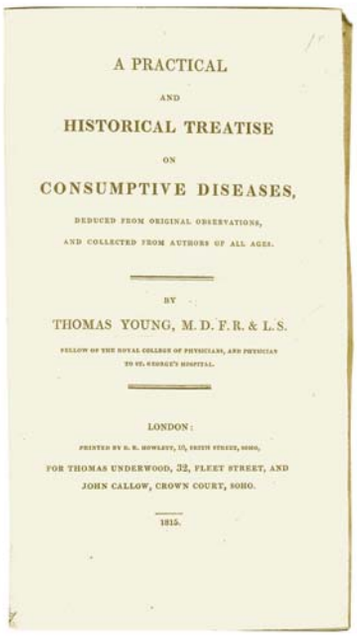
Thomas Young, painted by Sir Thomas Lawrence in the 1820s.

In addition, Young was a major scholar of ancient Greek; a phenomenal linguist who, after comparing the vocabulary and grammar of some 400 languages, in 1813 introduced the term Indo-European to describe the language family that includes Greek, Latin and Sanskrit; and an extraordinarily prolific and authoritative writer, mainly for the *Encyclopaedia Britannica*, on all manner of other subjects from carpentry and music to life insurance and ocean tides, as well as biographies of eminent scientists and scholars. His professional appointments included: professor of natural philosophy at the newly founded Royal Institution, where in 1802-03 he delivered what is generally regarded as the most far-reaching series of lectures ever given by a scientist; a physician at a major London hospital, St George's, for a quarter of a century; the secretary of the Admiralty's Board of Longitude and superintendent of its vital *Nautical Almanac* from 1818 until his death; and 'inspector of calculations' for a leading life insurance company in the 1820s. In 1794, he was elected a fellow of the Royal Society at the age of barely twenty-one, became its foreign secretary at the age of thirty, and turned down its presidency in his fifties. No wonder, the organizers of an exhibition at London's Science Museum in 1973 stated:

> Young probably had a wider range of creative learning than any other Englishman in history. He made discoveries in nearly every field he studied.

Born to a Quaker family in Somerset, Young was a child prodigy, who later trained as a physician in London, Edinburgh and Göttingen and at Cambridge, where he was known to the students as 'Phenomenon' Young with a mixture of respect and derision. He has never lacked for admirers among great scientists. Just after Young's death, the astronomer Sir John Herschel called him a 'truly original genius' and added that 'to do anything approaching to justice to his reputation … would call for the exercise of powers more nearly allied to his own than I can pretend to boast'. Later in the century, the physicist and physiologist Hermann von Helmholtz stated that Young

> ... was one of the most acute men who ever lived, but had the misfortune to be too far in advance of his contem-



A PRACTICAL

AND

HISTORICAL TREATISE

ON

CONSUMPTIVE DISEASES,

DEDUCED FROM ORIGINAL OBSERVATIONS,

AND COLLECTED FROM AUTHORS OF ALL AGES.

BY

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1815.

Young's work of 1815 on consumption, in which he drew on his experience of contracting the disease as a teenager.

poraries. They looked on him with astonishment, but could not follow his bold speculations, and thus a mass of his important thoughts remained buried and forgotten in the *Transactions* of the Royal Society until a later generation by slow degrees arrived at the rediscovery of his discoveries, and came to appreciate the force of his arguments and the accuracy of his conclusions.

While in 1899, lecturing on the centenary of the Royal Institution, the physicist Lord Rayleigh declared simply: 'it was seldom that [Young] was wrong'. A century later, in 2005, a Nobel laureate in physics, Philip Anderson, summarized Young's achievements as follows:

> He elucidated the optics of the eye, the wave theory of light, the laws of elasticity, the nature of the Egyptian hieroglyphic writing, and Lord knows how many other subjects.

Among non-scientists, Young's position has been less secure. His reputation, like those of Robert Hooke, Benjamin Franklin and Alexander von Humboldt, has suffered from his being a polymath. Polymathy is disturbing, especially to specialists, as historian Alexander Murray noted in connection with Sir William 'Oriental' Jones (1746-94), a polymath of the generation before Young's. Jones is primarily remembered today for being the first person to identify clearly the similarities between Sanskrit, Greek, Latin, Gothic (Germanic), Celtic and Old Persian (the language family which Young then dubbed 'Indo-European') – but Jones worked in many other fields too. An Oxford University symposium on the bicentenary of his death in 1994, edited by Murray, required separate contributions from a Sanskritist and an Arabist, a theologian, a lawyer (Jones was a judge) and an anthropologist, among others. Murray acutely remarked:

> History is unkind to polymaths. No biographer will readily tackle a subject whose range of skills far exceeds his own, while the rest of us, with or without biographies to read, have no mental 'slot' in which to keep a polymath's memory fresh. So the polymath gets forgotten or, at best, squashed into a category we *can* recognize, in the way Goethe is remembered as a poet, despite his claim to have been a scientist, or Hume as a philosopher, for all the six dumpy volumes of his *History of England*. [Yet,] There are times when a mind of exceptional range, bestriding many conventional disciplines, makes a breakthrough in each because he knows the others, and all of them go on their way, afterwards, without necessarily recognizing what he did or how he did it. If history is not to be chronically misremembered, it follows that a constant effort must be made – as constant as the mechanism that pulls invisibly in the other direction – to recall those polymathic minds that have made these critical turns.

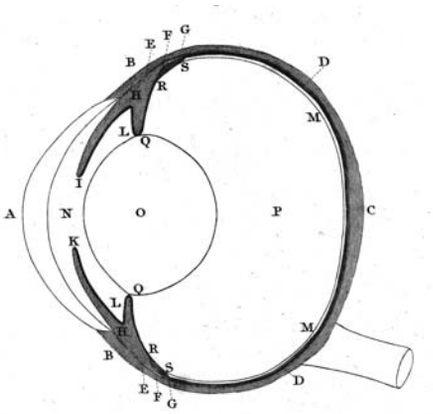


Diagram of the eye, from *A Course of Lectures on Natural Philosophy* (1807).

This applies very well to Young in respect of his research on ancient Egypt – which is probably the part of his work of greatest interest to most historians. Young's ability to decipher the Rosetta Stone and ancient Egyptian papyruses was undoubtedly fed by his powers of mathematical analysis and scientific intuition, by his philological scholarship in ancient Greek and Oriental languages, by his immersion since childhood in the civilizations of the classical world, and by his exceptionally detailed knowledge of the history of ideas in science and medicine, evident in all his publications, especially his greatest work, *A Course of Lectures in Natural Philosophy and the Mechanical Arts*, derived from his Royal Institution lectures and published in 1807, the second volume of which consists of a systematized and annotated catalogue containing 20,000 articles ranging from the ancient Greeks up to 1805. Yet, having said all this, Young's contribution to the hieroglyphic decipherment is frequently underplayed and sometimes even virtually dismissed in favour of Champollion's. Indeed, the dispute between them has become the most notorious in the history of archaeological decipherment, still partly unresolved to this day.

Young stated that Champollion had built his system of reading hieroglyphics on Young's own discoveries and his hieroglyphic 'alphabet', published in various articles and in a

TABLE III.

(By Nautical Almanac Tables.)

Longitude of my Observatory, deduced from Observations of 14 Eclipses of Jupiter's Satellites.

		Eclipse computed for Greenwich.	Observed in Blackman-street.	Longitude of the Station.
		H.	H.	
Aug. 3	Imm. 2 Sat.	11 3 24	11 5 26.80	2 2.80 E
18	Imm. 1st	11 59 48	12 0 8.09	0 20.09 E
Oct. 24	Em. 3	10 35 21	10 35 8.40	0 12.60 W
28	Imm. 1	9 11 16	9 10 40.76	0 35.24 W
Nov. 4	Em. 1	11 6 23	11 6 40.83	0 17.83 E
20	Em. 1	9 25 56	9 25 26.26	0 29.74 W
27	Em. 1	11 21 30	11 21 4.56	0 25.44 W
29	Em. 1	5 50 29	5 49 53.60	0 35.40 W
29	Em. 3	6 43 36	6 42 49.03	0 46.97 W
Dec. 6	Em. 1	7 46 12	7 45 55.10	0 16.90 W
1822 Jan. 14	Em. 1	6 23 33	6 23 40.48	0 7.48 E
29	Em. 2	6 56 3	6 55 45.30	0 17.70 W
Feb. 23	Em. 3	7 10 13	7 8 26.90	1 46.10 W
March 1	Em. 1	6 57 30	6 57 36.60	0 6.60 E

Mean Longitude of my Observatory by the 14 Observations	= 10.81 W
Known Longitude determined by myself	= 21.76 W
United Errors of the Tables and of Observation	= 10.95
Error of Observation applied with the contrary Sign	= − 0.085
Error of Tables, which places my Observatory to the East	= 10.865

Calculations from the *Nautical Almanac* of 1822, for which Young acted as superintendent (i.e. chief calculator).

'Scientific researches! – new discoveries in pneumaticks! – or an experimental lecture on the powers of air', published in May 1802 by James Gillray, probably shows Young, watched by Humphry Davy, administering laughing gas to Sir J.C. Hippisley, one of the managers of the Royal Institution.

major supplement to the *Encyclopaedia Britannica* in 1815-19. While paying generous tribute to Champollion's unrivalled progress from 1822 onwards, Young wanted his early steps recognized. This Champollion was adamantly unwilling to concede. Just weeks before Young's death in 1829, Champollion, writing in the midst of his expedition to ancient Egypt – he was then at Thebes in the Valley of the Kings (a place he had just named) – exulted to his brother:

> So poor Dr Young is incorrigible? Why flog a mummified horse? Thank M. Arago [a French physicist] for the arrows he shot so valiantly in honour of the Franco-Pharaonic alphabet. The Brit can do whatever he wants – it will remain ours: and all of old England will learn from young France how to spell hieroglyphs using an entirely different method ... May the doctor continue to agitate about the alphabet while I, having been for six months among the monuments of Egypt, I am startled by what I am reading fluently rather than what my imagination is able to come up with.

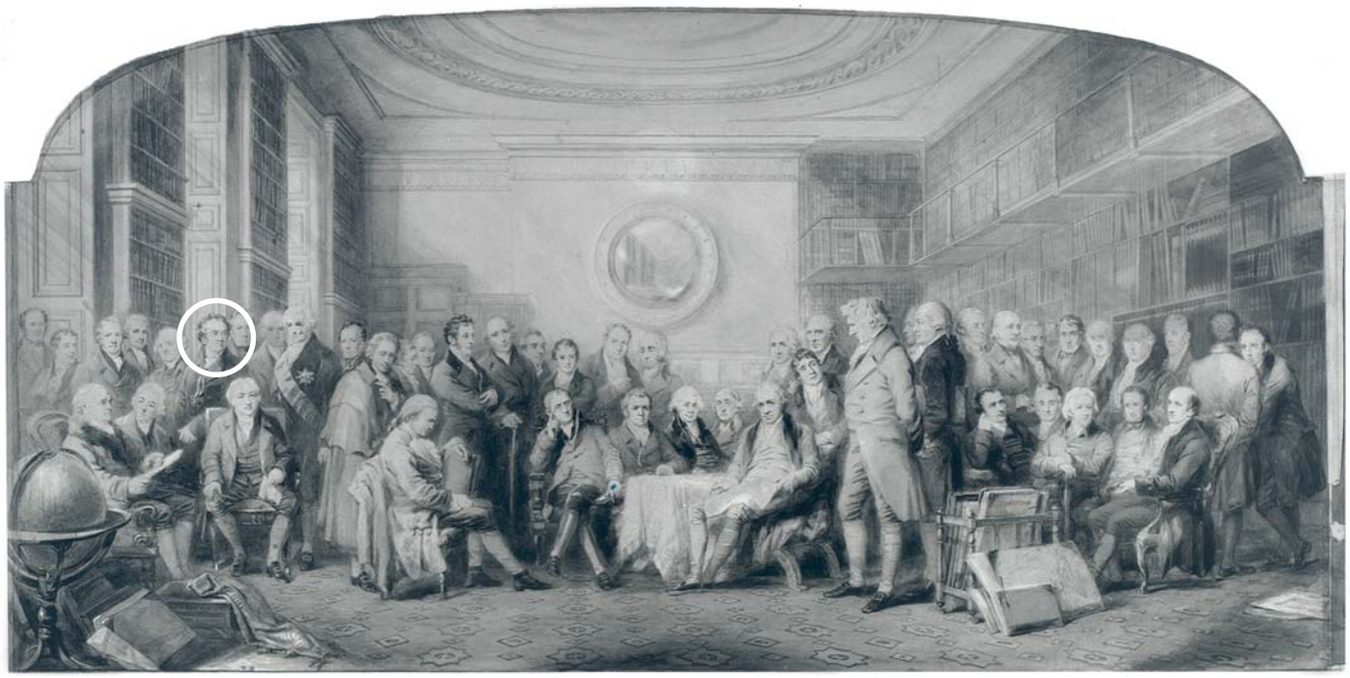
The nationalistic overtones – at times evident in Young's writings too – have to some extent bedevilled honest discussion of Young and Champollion ever since. Even Young's friend in physics, Dominique Arago, turned against his work on the hieroglyphs, partly because Champollion was an honoured fellow-countryman. Thus, a recent French book by Robert Solé and the Egyptologist Dominique Valbelle, *The Rosetta Stone: The Story of the Decoding of Hieroglyphics,* deliberately omits the trenchant criticism of Champollion's character written to Young in 1815 by Champollion's former teacher Sylvestre de Sacy (who warned Young that Champollion might plagiarize his work); it also omits other episodes in which Champollion is generally held to have suppressed an erroneous publication of his own and to have failed to acknowledge a crucial inscriptional clue concerning Cleopatra provided by the antiquarian William Bankes.

Egyptologists, who are best placed to understand the intellectual 'nitty-gritty' of the dispute, are drawn to Champollion more than Young because he founded their subject. Even John Ray, a professor of Egyptology at Cambridge University who has done most in recent years to give Young his due, admits:

> ... the suspicion may easily arise, and often has done, that any eulogy of Thomas Young must be intended as a denigration of Champollion. This would be shameful coming from an Egyptologist.

Then there is the cult of genius: many of us prefer to believe in the primacy of unaccountable moments of inspiration over the less glamorous virtues of step-by-step, rational teamwork. Champollion maintained that his advances came almost exclusively out of his own mind, arising from his indubitably passionate devotion to ancient Egypt. He pictured himself for the public as a 'lone genius' who solved the riddle of ancient Egypt's writing single-handedly. The fact that Young was known primarily for his work in fields other than Egyptian studies, and that he published on Egypt anonymously in 1815-19 (to protect his professional reputation as a physician), made Champollion's solitary self-image easily believable for most people. It is a discomforting thought, especially for a specialist, that a non-specialist might enter an academic field, transform it, and then move on to work in an utterly different field.

Lastly, Young and Champollion were highly contrasting personalities. Champollion had tunnel vision ('for-



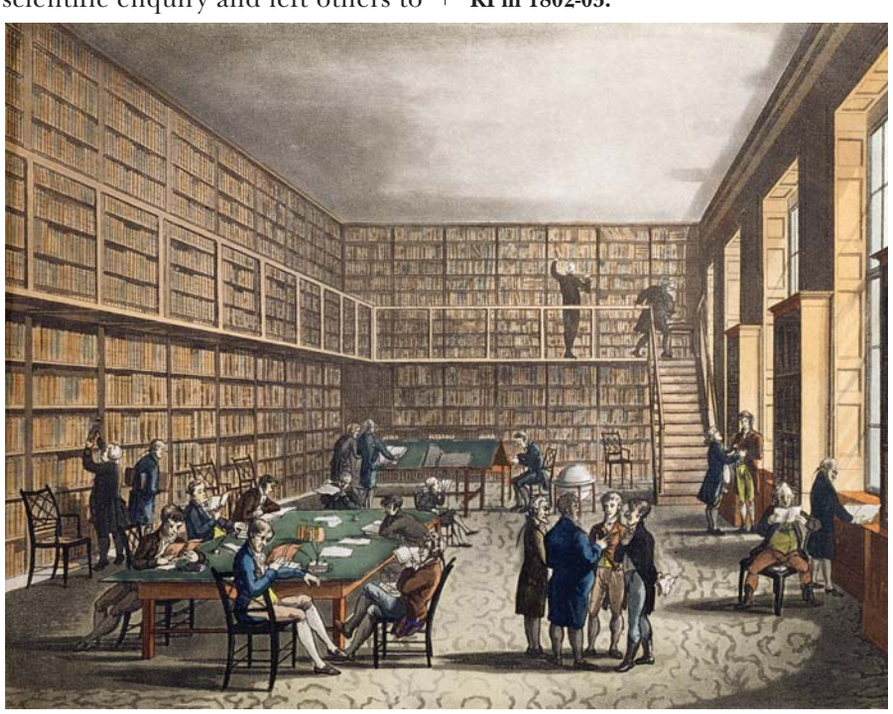
British Men of Science in 1807-08, including Young (circled).

tunately for our subject', says Ray); was prone to fits of euphoria and despair; and had personally led an uprising against the French king in Grenoble, for which he was put on trial. The polymath Young, who had a total lack of engagement with party politics, was a man who 'could not bear, in the most common conversation, the slightest degree of exaggeration, or even of colouring' (said his closest friend, the antiquarian and politician Hudson Gurney).

Young never went to Egypt, and never wanted to go. In founding an Egyptian Society in London in 1817, to publish as many ancient inscriptions and manuscripts as possible, so as to aid the decipherment, Young remarked that funds were needed 'for employing some poor Italian or Maltese to scramble over Egypt in search of more.' Champollion, by contrast, had long dreamt of visiting Egypt and doing exactly what Young had depreciated, ever since he saw the hieroglyphs as a boy; and when he finally got there, he was able to pass for a native, given his swarthy complexion and his excellent command of Arabic. In his wonderfully readable and ebullient *Egyptian Diaries*, Champollion describes entering the temple of Ramses the Great at Abu Simbel, which was blocked by millennia of sand:

> I almost entirely undressed, wearing only my Arab shirt and long underwear, and pressed myself on my stomach through the small aperture of a doorway which, unearthed, would have been at least 25 feet high. It felt as if I was climbing through the heart of a furnace and, gliding completely into the temple, I entered an atmosphere rising to 52 degrees: holding a candle in our hand, Rosellini, Ricci, I and one of our Arabs went through this astonishing cave.

Such a perilous adventure would probably not have appealed to Young, even in his careless youth as an accomplished horseman roughing it in the Scottish Highlands. His motive for deciphering the Egyptian scripts was fundamentally philological and scientific, not aesthetic and cultural (unlike his attitude to the classical literature of Greece and Rome). Many Egyptologists tend not to sympathize with this motive. They also know little about Young's scientific work and his renown as someone who initiated many new areas of scientific enquiry and left others to develop them. As a result, some scholars seriously misjudge him. Not knowing of his fairness in recognizing other scientists' contributions and his fanatical truthfulness in his own scientific work, they jump to the conclusion that Young's attitude to Champollion was chiefly envious. The classicist Maurice Pope (1999) called Young, 'a man with a grievance … [who] clearly hankered for something with a promise of immortality in it.' The Champollion biographers Lesley and Roy Adkins (2000) are explicit: 'while maintaining civil relations with his rival,



The library of the Royal Institution, 1809, which had been founded by Count Rumford ten years earlier to promote the application of science. Young gave famously wide-ranging discourses at the RI in 1802-03.

Jean-François Champollion (1790-1832), who beat Young to the prize of deciphering Egyptian hieroglyphs in 1822. Painting by Leon Cogniet.

Young's jealousy had not ceased to fester.' But such an emotion would have been out of character for Young, and it would have made little sense anyway given his scientific achievements and the fact that these were increasingly recognized from 1816 onwards – to begin with by French scientists. The truth is that for Champollion, the success of his decipherment was a matter of make-or-break as a scholar; for Young, his Egyptian research was essentially yet another fascinating avenue of knowledge to explore for his own amusement.

After 1822-24, when Champollion published his landmark book, Young more or less gave up work on the hieroglyphs. But he continued to work on the second undeciphered Egyptian script found on the Rosetta Stone, which Young called 'enchorial' but which Champollion termed 'demotic'. At this point Champollion, for whatever reason, offered Young access to the swelling collections of demotic manuscripts under his curatorship in the Louvre Museum in Paris. On his deathbed, Young could justifiably write in his final publication, *Rudiments of an Egyptian Dictionary in the Ancient Enchorial Character, Containing All the Words of Which the Sense Has Been Ascertained*, 'thirty years ago, not a single article of the list [of words in the dictionary] existed even in the imagination of the wildest enthusiast: and that within these ten years, a single date only was tolerably ascertained, out of about fifty which are here interpreted, and in many instances ascertained with astronomical precision.' John Ray sums up:

> Young was the first person since the end of the Roman Empire to be able to read a demotic text, and, in spite of a proportion of incorrect guesses, he surely deserves to be known as the decipherer of demotic. It is no disservice to Champollion to allow him this distinction.

A couple of years before his death, in an autobiographical sketch written for his favourite sister-in-law intended for a future posthumous edition of the *Encyclopaedia Britannica*, Young wrote of himself:

> He might for example, have been styled without impropriety and almost with equal justice, in the middle of a history of his life, a physician, a classical scholar, a linguist, an antiquarian, a biographer, an optician, or a mathematician ... Whether the public would have been more benefited by his confining his exertions within narrower limits, is a question of great doubt.

For those of us who feel instinctively drawn to versatility of genius, Young is an inspiration; others whose taste is for genius with a narrow focus (like Champollion's) will regard Young with scepticism. What is undeniable, though, is that he really did approximate to 'the last man who knew everything' – however much he himself would have denied this – and we can safely say, with the endless expansion and bifurcation of knowledge, that no one will be able to stake this awesome claim ever again.

An illustration of a painting of Rameses IV in the Valley of the Kings, from Champollion's *Monuments of Egypt*, 1835-45.

Young's comparison of the last line of the Rosetta stone in the three scripts, hieroglyphic, demotic and Greek.

FOR FURTHER READING

George Peacock, *Life of Thomas Young , M.D., F.R.S.* (John Murray, 1855, republished by Thoemmes Press, 2003); Andrew Robinson, *The Last Man Who Knew Everything: Thomas Young* (Pi Press, 2006); Thomas Young, *A Course of Lectures on Natural Philosophy and the Mechanical Arts*, 2 vols (Joseph Johnson, 1807, republished in 4 vols by Thoemmes Press, 2002); Thomas Young, *Miscellaneous Works of the Late Thomas Young*, M.D., F.R.S., 3 vols (John Murray, 1807, republished by Thoemmes Press, 2003).

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