MATHEMATICS IN LITERATURE

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Shortly after the first two men arrive on the moon, they suffer the same fate as Lemuel Gulliver did on one of his Travels: that of being tied up by the locals, who in this instance — according to H. G. Wells — are creatures called Selenites. The two men now — rather late in the day — wonder how to communicate with aliens with whom one shares neither language nor bodily form. One of them remembers a suggestion by Francis Galton that you should display knowledge of basic truths of Euclidean geometry, on the supposition that, if the aliens are intelligent, they too will know these truths. For example, if a triangle has two equal sides it also has two equal angles. Or, if you construct squares on the sides of a right-angled triangle, the area of the square opposite the right angle is equal to the total of the areas of the other two squares.

As it turns out, the men are untied without recourse to geometry, and, within 50 pages, one of them — Mr Bedford — has nipped back to Earth in their space-vehicle, leaving his companion — Mr Cavor — stranded. We now hear from Cavor only by means of messages flashed across the space between moon and planet. We learn in this way that some of the Selenites are MATHEMATICIANS:

> If ... a Selenite is destined to be a mathematician, his teachers and trainers set out at once to that end. They check any incipient disposition to other pursuits, they encourage his mathematical bias with a perfect psychological skill. ... the mathematical faculties of his brain grow, and the rest of him only so much as is necessary to sustain the essential part of him. At last, save for rest and food, his one delight lies in the exercise

> and display of his faculty, his one interest in its application, his sole society with other specialists in his own line. His brain grows continually larger[;] ... the portions engaging in mathematics ... bulge ever larger and seem to suck all life and vigour from the rest of his frame. His limbs shrivel, his heart and digestive organs diminish, his insect face is hidden under its bulging contours ... ; he seems deaf to all but properly enunciated problems. The faculty of laughter, save for the sudden discovery of some paradox, is lost to him; his deepest emotion is the evolution of a novel computation.

This satire evokes standard stereotypic images, in particular the anti-social mathematician locked in his own frame of reference. But two good key words **do** appear in the passage: "application" and "computation". What do we mean by an "application" of mathematics? Many people are probably at least dimly aware that the term "Applied Mathematics", as it has been commonly used, refers merely to certain particular areas of application. But results from one area of pure mathematics can be used to solve a problem in another area of pure mathematics; this too is an "application" of the results, an application internal to mathematics. Other people will instead be interested in external applications, such as using mathematics to help us to understand biological processes. When Wells mentions computation, we must respond that not all mathematicians are particularly interested in computing anything at all.

We must vehemently contradict any notion that no mathematician will listen to your problem unless it is "properly enunciated" or "correctly formulated". A consultant mathematician or statistician must be ready to help to *formulate* a problem — which may often be substantially different from what the client thought it was.

Ioan James, of the Oxford Mathematical Institute, recently published an article *Psychologists look at mathematicians*. This quotes an early eighteenth century work by the physician Bernardino Ramazzini that is so similar to H. G. Wells's tirade that we may ask whether the two texts were independently written. Here is Ramazzini, translated into English:

> Mathematicians have to ponder the most abstruse problems far removed from material existence, and to this end the mind must

> be kept detached from the senses and have hardly any dealings with the body; hence mathematicians are nearly all dull, listless, lethargic and never quite at home in the ordinary affairs of men. It follows that all the organs and in fact the whole body moulder, as it were, and become torpid and feeble as though condemned to perpetual darkness.

James goes on — in serious vein — to discuss the incidence of different types of autism amongst mathematicians.

But let's leave that for now, and let's leave H. G. Wells. Another author who sent a man to the moon was Edgar Allan Poe who, in the short story *The Unparalleled Adventure of one Hans Pfaall*, expects us to do some mathematics with him, during Pfaall's journey:

> ... the barometer showed an elevation of 26,400 feet, or five miles to a fraction. ... it is very easily calculated by means of spherical geometry, how great an extent of the earth's area I beheld. The convex surface of any segment of a sphere is, to the entire surface of the sphere itself, as the versed sine of the segment to the diameter of the sphere. Now, in my case, the versed sine — that is to say, the *thickness* of the segment beneath me — was about equal to my elevation ... 'As five miles, then, to eight thousand', would express the proportion of of the earth's area seen by me. In other words, I beheld as much as a sixteen-hundredth part of the whole surface of the globe.

Wow! We here need to know what is meant by "segment" (not the same as a segment of an orange) and by "versed sine" (an obsolete term that has had mutually contradictory meanings). I suspect that most readers hurry on regardless — as I now do.

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Literature has many examples of **young people** learning mathematics, or at least confronted by it. Let us start with the poem *Mathématiques* by Jules Supervielle (1884–1960). This poem expresses something very different from the

> elevation and composed delight

that Wordsworth [in the *Prelude*] found in geometry.

> Quarante enfants dans une salle,
> Un tableau noir et un triangle,
> Un grand cercle hésitant et sourd,
> Son centre bat comme un tambour...
>
> Forty children in a room,
> A blackboard with a triangle,
> A large circle, uncertain and deaf,
> Its center throbs like a drum.
>
> Letters, exiles, outcasts,
> Waiting in pain.
>
> The harsh parapet of a trapezium,
> A voice rises and falls,
> And the raging problem
> Bites its tail in its frenzy.
>
> An angle opens its jaws.
> Is it a hound? A she-wolf?
>
> And **every number** in the world,
> All those insects that tear down
> And rebuild their ant-hill
> Beneath the dazed glazed gaze of the boys.

So the children of line 1 turn out in the final line to be — surprise, surprise — boys. This is not the first time in literature that 40 pupils are later revealed as being all male. Let's go to the Grand Academy of Legado, visited by Gulliver in the third of his Travels:

> The first professor I saw was in a very large room, with forty pupils about him. ... observing me to look earnestly upon a frame, which took up the greatest part ... of the room, he said ... that ... , by his contrivance the most ignorant person ... might write books in philosophy, poetry, politics, laws, mathematics and theology, without the least assistance from genius or study.

Words were pasted inside this frame.

> The pupils, at [the professor's] command, took each of them hold of an iron handle, whereof there were forty fixed round the edges of the frame; and giving them a sudden turn, the whole disposition of the words was changed.

Whenever any meaningful sequence of three or four words appeared fortuitously, one of the 'lads' wrote it down for future use in some *magnum opus*.

The mood of Supervielle's poem has something in common with that of the poem *Numbers* by Lawrence Binyon (1869–1943):

> Bodiless Numbers! ...
> O inhuman numbers! ...
> Are you masters or slaves —
> Subtlest of man's slaves, —
> Shadowy Numbers?

Contrariwise, Carl Sandburg's peom *Arithmetic* says that

> Arithmetic is where numbers fly like pigeons in and out of your head.

From 40 boys to just 1, the child in Colette's *L'Enfant et les Sortilèges* [The Child and the Magic Spells]. This boy, having seen the golden-haired Princess snatched away from him, then beholds something quite different:

> Un petit vieillard bossu, crochu, barbu,
> vêtu de chiffres, coiffé d'un π

> An old, small, bearded hunchback,
> his garments made of numbers,
> his hat shaped like the Greek letter π

And this *vieillard* is reciting scraps of numerical problems:

> Deux robinets coulent dans un réservoir!
> [Two taps run into a tank!]
> Deux trains omnibus [two stopping trains] quittent une gare —
> Une paysanne
> Porte tous ses œfs au marché!

And the child cries out in terror:

> Mon Dieu! C'est l'Arithmétique!

The old man then dances round him, singing nonsense arithmetic:

> Quatre et quat': dixhuit,
> Onze et six: vingt-cinq,
> Five times nine makes eighty-three,
> Two times six makes twenty-five ...

and the child, fascinated, repeats

> Two-times-six-makes-twenty-five?!

Colette's Old Man Arithmetic could well have inspired the Mathemagician in Norton Juster's *The Phantom Tollbooth* of 1961. The Mathemagician

> was dressed in a long flowing robe covered entirely with complex mathematical equations[,] and [in] a tall pointed cap that made him look very wise.

The French philosopher, poet and mathematician Paul Valéry tells an interesting true story in one of his *Cahiers* [Notebooks]:

> Vu Estaumier, nommé Directeur de l'École Supérieur des PTT. Me dit que, enfant, à 6 ans il avait appris à compter jusqu'à 6 — en 2 jours. Il comprit alors qu'il y avait 7, et ainsi de suite, et il prit peur qu'il fallût apprendre une infinité de noms. Cet infini l'épouvanta au point de refuser de continuer à apprendre les autres nombres.

So Estaumier had learned to count up to 6 at the age of 6. He then realised that there must be a 7, for which he would have to learn a new name. And So On! And, fearing that a whole infinitude of names must be learnt for this infinite series, he gave up. He did not know that, if you learn the numbers 1 to 9 and the number 30, you then can count from 31 to 39:

> "Thirty-nine steps — I counted them — high tide, 10.17 p.m."
> [John Buchan]

Estaumier is not alone in getting stuck after the number 6. Here is a sad tale from the Literature of the Absurd; the author is Daniil Kharms (1905–1942, real name Yuvachev):

> An amazing thing happened to me: I suddenly forgot which came first, 7 or 8. I went round to my neighbours and asked them for their opinion. I was truly amazed that they too could not remember which order the numbers came in.
>
> We all went round to the Gastronom shop at the corner of Znamensky Ulitsa and Basseynaya Ulitsa and asked the cashier. She smiled sadly, took a tiny hammer out of her mouth, and — with a slight twitch of her nose — said 'I think 7 comes after 8 in those cases where 8 comes after 7.'
>
> We thanked the cashier and ran, full of glee, out of the store. But then, thinking over what she had said, we fell silent again, as her words turned out to make no sense.
>
> What were we to do? We went into the Lyetiny Sad [the Summer Garden] and counted trees. But after we reached 6, we stopped and argued. Some of us thought 7 came next, and others thought it was 8.
>
> We argued for a long time, but fortunately a little boy fell off a park bench and broke both his jaws. This distracted us from our argument.
>
> Then we all went home.

Many languages have mnemonic rhymes to help us to learn the numerical sequences:

> One, two, buckle my shoe,
> Three, four, knock on the door,
> Five, six, pick up sticks,
> Eight, seven, God's in Heaven!

Of course eight comes before seven! Or does it?:

> One, two, three, four, five,
> Once I caught a fish alive!
> Six, seven, eight, nine, ten,
> Then I put it back again.

To understand the French equivalent, we need to know that "cueuillir des cerises" means "to gather cherries":

> Un, deux, trois, allons dans les bois,
> Quatre, cinq, six, cueuillir des cerises,
> Sept, huit, neuf, dans mon panier neuf,
> Dix, onze, douze, elles seront toutes rouges!

Only "*un point*" out of four for rhymes, I should say. In German, "alte Hex" is an old witch:

> Eins, zwei, Polizei,
> Drei, fier, Offizier,
> Fünf, sechs, alte Hex,
> Sieben, acht, gute Nacht.

Just before we move on from counting, let's take *Les belles familles* by Jacques Prévert (1900-1977). You need know, in advance, only that King Louis the Tenth of France [Louis dix] was known as Louis le Hutin [Louis the Quarrelsome]:

> Louis un
> Louis deux
> Louis trois
>
> Louis quatre
> Louis cinq
> Louis six
> Louis sept
> Louis huit
> Louis neuf
> Louis dix (dit le hutin)
>
> Louis onze
> Louis douze
> Louis treize
> Louis QUATORZE
> Louis quinze
> Louis SEIZE
>
> Louis ... dix-huit

et plus personne plus rien ...
Qu'est-ce que c'est que ces gens-là
qui ne sont pas foutus
de compter jusqu'à vingt?

[Who were these guys
who couldn't even count up to 20?]

Amongst the worst **bad** mathematics that I know in literature there is a passage from Henry James. In the 1870's, he was fulminating about the building of the Isle of Wight railway from Ryde to Ventnor:

> ... a railway in the Isle of Wight is a gross impertinence, is in evident contravention to the natural style of the place. ... Never was a clearer opportunity for sacrificing to prettiness; never was a better chance for not making a railway. But now there are twenty trains a day, so that the prettiness is twenty times less.
>
> [publ. in *English Hours*, 1905]

O.K., let's do some arithmetic. Before the railway was built, Henry James might well have ranked the Isle of Wight, on a nought-to-ten scale of prettiness, at about 9. Multiplying this 9 by 20 gives 180. If the prettiness is now 20 times less than it was before, it is $9 - 180$, that is to say, -171, *on a nought-to-ten scale of course*. And does James really believe that prettiness is reduced proportinately to the number of trains run? This would mean that the original prettiness could be restored by a Rail Strike.

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University studies of mathematics feature in some nineteenth century literature, notably in two of the great books of English literature.

When Daniel Deronda, in George Eliot's stupendous novel of the same name, consults his guardian, Sir Hugo, before going up to Cambridge, Sir Hugo responds like this:

> I should think you can take up anything you like. You are in deeper water with your classics than I ever got into, and if you are rather sick of that swimming, Cambridge is ... where you can go into mathematics with a will. ... I should like you to do

> yourself credit, but for God's sake don't come out as a superior kind of idiot, like young Brecon, who got a Double First, and has been learning to knit braces ever since.

In the event, Daniel

> applied himself vigorously to mathematics, ... and the favourable opinion of his tutor ... determined him to try for a mathematical scholarship in ... his second year .... But ... he felt a heightening discontent with the wearing futility and enfeebling strain of a demand for excessive retention and dexterity without any insight into the principles which form the vital connections of knowledge.

No mean piece of educational commentary!

At about the age of 15, Victor Frankenstein beheld the effect of a lightning strike on an oak tree, which was thereby

> reduced to thin ribands of wood.

This — Mary Shelley tells us — gave him a lively interest in natural philosophy, and he reports that

> In this mood I betook myself to the mathematics, and the branches of study pertaining to that science, as being built upon secure foundations, and so worthy of my consideration.

When, 2 years later, Frankenstein went to the University of Ingolstadt, in Bavaria, Professor Waldman advised him

> If your wish is to become really a man of science, and not merely a petty experimentalist, I should advise you to apply to every branch of natural philosophy, including mathematics.

But the force of Frankenstein's destiny was already so heavily upon him, that Waldstein's advice served only to precipitate the young student to his doom, to his

> utter and terrible destruction.

At least Deronda and Frankenstein had **aptitude** for mathematics, and they applied themselves to it. Not so Amory Blaine who, at the start of his third year at Princeton (in Scott Fitzgerald's *This Side of Paradise*), spends

> four hours a morning in the stuffy room of a tutoring school, imbibing the infinite boredom of conic sections.

The tutor

> drew diagrams and worked equations from six in the morning until midnight.

Amory

> found it impossible to study conic sections; something in their calm ... respectability ... distorted their equations into insoluble anagrams.

Why Princeton students had to pass an exam in conic sections in order to get anywhere, you might well ask. The requirement even extended to the sporting types, including the student Langueduc, who was merely

> six-foot-three of football material.

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For me, perhaps the finest piece of literary writing involving mathematics is Aldous Huxley's miniature masterpiece *Young Archimedes* [Fadiman, 1958]. This is not a tale of ancient Syracuse, but the story of a Tuscan peasant-boy, Guido, who has outstanding natural abilities. But just as George Eliot's *Daniel Deronda* is in a sense two books — the 'English' book and the 'Jewish' one — naturally interlocking and interacting, with the whole greater than the sum of the parts, so Huxley's *Young Archimedes* is **two** accounts. We firstly have the glorious word-painting of the Tuscan landscape, its splendours changing with the seasons, with the weather, with the time of day; the landscape with its mountains and valleys, its woods and its wilderness, its dwelling-houses and its cultivated terraces. **Then** we have the characters of the story. There's landlady Signora Bondi. Before we know what a force for evil she is, we smile when we're told that

> Her vitality, if you could have harnessed it and made it do some useful work, would have supplied a whole town with electric light.

We have the English family who are the tenants, including 4-year-old Robin. And we have the peasant family in the adjoining building, including the precocious but patient Guido, aged between 6 and 7.

When the Englishman first plays, on his gramophone, a record of the slow movement of Bach's Double Violin Concerto, Guido — who has previously known only guitar music — is transfixed. He can appreciate the interweaving of the parts, he can sing back a long phrase, he wants more. We may ask whether he heard the movement played at the very slow tempo used when I was young, or at one of the faster tempi of today (which are, of course, still slow if you count 4 in a bar instead of 12). But does it matter?

One afternoon, when the boys were playing together in the garden, they fell suspiciously quiet. Robin's Babbo [Papa] looked out from the balcony to see what was going on below. He saw

> Guido, with a burnt stick in his hand, demonstrating on the smooth paving stones of the path, ... the Theorem of Pythagoras — not in Euclid's way, but by the ... method ... which was, in all probability, used by Pythagoras himself.

Here we have unspoilt genius, and who knows what would have been the future if the malign Signora had not been around. When the tragedy comes — and it is terrible — it comes off-stage. We're spared to that extent. And above the misery of the two fathers as they visit Florence afterwards, it was

> a day of floating clouds — great shapes, white, golden, and gray; and ... On the innumerable brown and rosy roofs of the city the afternoon sunlight lay softly, sumptuously, and the towers were as though varnished and enamelled with an old gold.

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When I told a mathematical colleague that I was to talk on *Mathematics in Literature*, the response was: "Oh, that will last all of 15 minutes". In fact, to cover all that I wished to say would have needed 3 lectures, whereas all

that I *might* have included would require a whole semester. I've side-stepped statistical matters such as Charles Dickens's rant [in *Hard Times*] against "tabulations", and Aldous Huxley's instance [in Chapter 3 of *Brave New World*] of what can happen on a planet where the number of inhabitants is vastly greater than the number of surnames. I've skirted round mathematics mistress Greta McCraw, whose

> bony frame took on the proportions of one of her own Euclidean triangles, ... who in times of crisis could be unexpectedly shrewd, even practical ...

but who, in Joan Lindsay's book, disappeared for ever, with two of her girls, at *The Picnic at Hanging Rock*. I've flown round Nevil Shute's airplane pilot who is nearly downed in the sea through transposed digits in a number specifying his destination. I've left out fantasies based on Möbius strips and Klein bottles; I've stayed within the 4 dimensions of space and time. I've said nothing of literature built on Fibonacci numbers and codes and cyphers and cryptograms — and this last has prevented me from drawing on my visit, a few years ago, to Charleston, South Carolina, right by the location of Edgar Allan Poe's story *The Gold-Bug*. And it has saved me from applying my knowledge (since boyhood) of the **magnificent** Rosslyn Chapel (near Edinburgh), where ends the action in a certain "page-turner" — a book much deplored within the Roman Catholic Church, a book whose title you know but I dare not mention. Also in this talk, I've so far ignored parodies, but — given my Scottish background — I must at least give you two stanzas of Sir Arthur Quiller-Couch's hilarious "New Ballad of Sir Patrick Spens":

> The king sits in Dunfermline toun,
> Drinking the blude-red wine,
> "O wha will rear me an equilateral triangle
> Upon a given straight line?"
>
> O up and spake an eldern knight,
> Sat at the king's richt knee —
> "Of all the clerks by Granta side
> Sir Patrick bears the gree."

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But one further strand must be introduced prominently into this talk. Let's trace it back to a notorious sentence written in Latin by St Augustine of Hippo. One of the English translations is this:

> The good Christian should beware of mathematicians and of all those who make empty prophecies.

Sure, the Latin has the word *mathematice*, but on the web you'll speedily find the suggestion that the word should be translated as *soothsayer*. What **is** going on here? We first note that the original Greek $\mu\acute{\alpha}\theta\eta\mu\alpha$ means "learning", "study" or "science". But with St Augustine, as with attitudes during a thousand years or more after his time, we must ask not only What were mathematicians actually doing?, but also What were they perceived as doing?, and, if they were employed by someone, What were they employed to do? In particular, were they using their mathematics to make astrological predictions and to make incursions into philosophy and divinity? In England, in Tudor times [Woolley, 2002], the authorities burned mathematical books, judging them to be

> conjuring books

and if a book had red letters or mathematical diagrams, this was sufficient [Thomas, 1971] for it to be judged

> Popish or diabolical.

Even Mrs Malaprop [Sheridan] was at it:

> I would by no means wish a daughter of mine to be a progeny of learning; ... neither would it be necessary for her to handle any of your mathematical, astronomical, diabolical instruments:- But ... she should have a supercilious knowledge in accounts; — and ... I would have her instructed in geometry, that she might know something of the contagious countries ...

Ah! — if only we has Mrs Malaprop's proof of the 4-color theorem ...

Running back again over the centuries, we encounter the Alexandrian mathematician Hypatia, daughter of Theon Alexandricus, with whom she worked on mathematical topics including Euclidean geometry. She lived during St Augustine's lifetime. In Charles Kingsley's historical novel *Hypatia*,

which he claimed to have researched carefully, Theon paces impatiently up and down the room, wrestling with a mathematical problem and crying out [Chap. 2]

> 'the symbol should be an expanding series of the powers of three, and yet that accursed binary factor *will* introduce itself.'

He seems to be doing pure mathematics. But later he is to ask [Chap. 15]

> 'Are we to study ... conic sections, that we know better how to construct machinery; or rather to devise from them symbols of the relations of Deity to its various emanations?'

Likewise Hypatia asks us [Chap. 15]

> 'to recognise[,] in the equilateral triangle inscribed within the circle, and touching it only with its angles, the three supra-sensual principles of existence, which are contained in Deity ... '.

She is murdered by the Christian mob. What an irony it is that, as painted high in the apse of the now magnificently restored eighteenth-century church of St Paul, Deptford (not many a mile from here), an inverted equilateral triangle, inscribed in a circle, symbolises the Christian Trinity.

Leaping back to French literature, we have Lautréamont's character Maldoror who, having forsaken God, is an acolyte of a mathematical trinity:

> Arithmétique! algèbre! géometrie!
> trinité grandiose! triangle lumineux!
> Celui qui ne vous a pas connues est un insensé!

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From our literary examples, what conclusions can we draw about actual and perceived roles of mathematics in our civilisation and our society? Not many, I fear. We might well suppose that a long time, perhaps centuries, would be needed to recover from the religious anathematisation of mathematics. But we must then ask whether mathematics fared better in parts of the world not influenced by Christianity and by the Reformation. As for notions that mathematics is boring, terrifying or impenetrable, why should we blame this on mathematics rather than on some of its teachers and their

teaching methods?

In universities, aggro between mathematicians and non-mathematicians is not especially likely to arise because a particular mathematician has bulges above an insect face, or deposits of pigeon-poo on the brain. Trouble seems more likely to come from all parties being required to share teaching facilities, to have common protocols for assessing staff and student performance, and to attend teacher-training sessions where there is little or no recognition of the distinctive methods appropriate for teaching mathematics.

A University mathematician who shows symptoms of being 'torpid' or 'listless' may be like that, not because of being a mathematician, but because of not having learnt how to manage their time and not having suitable colleagues to work with.

But let us finish with some professorial frivolity from the musician and crime-writer Edmund Crispin:

> They were going down a narrow path, flanked by high yew hedges, which skirted the churchyard. And from the other side of these hedges they suddenly heard a voice.
>
> '*You may seek it with thimbles,' . . . 'and seek it with care, you may hunt it with forks and hope. . .*'
>
> Fen stopped dead. 'I know who that is', he said gloomily.
>
> '*You may threaten its life with a railway share,*' pursued the voice, '*You may charm it with smiles and soap. . .*' . . .
>
> 'That, I fancy,' said Fen grimly, 'is the Regius Professor of Mathematics.'
>
> A gruff, hairy, little old man put his head over the hedge. . . .
>
> 'I am holidaying,' said the head. . . . 'I shall accompany you.' . . . 'I shall recite you *The Hunting of the Snark*.' . . .
>
> 'Are you sure you want to?' [Fen] asked feebly.
>
> 'I am sure of nothing,' said the [Regius] Professor, 'except the differential calculus. And I'm not as good on that as I used to be.'

An outline bibliography

St Augustine of Hippo (345–430). *De Genesi ad Litteram*.

Lawrence Binyon (1869–1943). *Numbers* (poem).

John Buchan [Lord Tweedsmuir] (1875–1940). *The Thirty-nine Steps*.

Lewis Carroll [Charles L. Dodgson] (1832–1898). *The Hunting of the Snark*.

Colette [Sidonie Gabrielle Colette] (1873–1954). *L'Enfant et les Sortilèges*.

Edmund Crispin [(Robert) Bruce Montgomery] (1921–1978). *Holy Disorders*.

Charles Dickens (1812–1870). *Hard Times*.

George Eliot [Mary Ann Evans] (1819–1880). *Daniel Deronda*.

Clifton Fadiman (1904–1999). *Fantasia Mathematica* (anthology).
New York: Springer (1958).

Scott Fitzgerald (1896–1940). *This Side of Paradise*.

Aldous Huxley (1894–1963). *Young Archimedes*.

———————————. *Brave New World*.

Henry James (1843–1916). *English Hours*.

Ioan James. "Psychologists look at mathematicians".
Bulletin of the I. M. A. **45** (2009) 26–29.

Norton Juster (1929–). *The Phantom Tollbooth*.

Daniil Kharms [Daniil Ivanovich Yuvachev] (1905–1942). *Sonnet*.
[In Russian; various English translations.]

Charles Kingsley (1819–1875). *Hypatia* or *New Foes with an Old Face*.

Comte de Lautréamont [Isidore Lucien Ducasse] (1846–1870).
Les Chants de Maldoror – Chant deuxième.

Joan Lindsay [Lady Lindsay] (1896–1984). *Picnic at Hanging Rock.*

Edgar Allan Poe (1809-1849). *The Unparalleled Adventure of one Hans Pfaall.*

———————————. *The Gold-Bug.*

Jacques Prévert (1900–1977). *Les belles familles* (poem).

Sir Arthur Quiller-Couch (1863–1944). *The New Ballad of Sir Patrick Spens.*

Barnardino Ramazzini (1633–1714). *De morbis artificum diatribe.*

Carl Sandburg (1878–1967). *Arithmetic* (poem).

Mary Shelley [Mary Wollstonecraft Godwin] (1797–1851).
Frankenstein or *The Modern Prometheus.*

Richard B. Sheridan (1751–1816). *The Rivals* (play).

Nevil Shute [Nevil Shute Norway] (1899–1960).

Jules Supervielle (1884–1960). *Mathématiques* (poem).

Jonathan Swift (1667–1745). *Gulliver's Travels.*

Sir Keith Vivian Thomas (1933–). *Religion and the Decline of Magic.*
London: Weidenfeld & Nicholson (1971).

Paul Valéry (1871–1945). *Cahiers.*

H. G. Wells (1866–1946). *The First Men in the Moon.*

Benjamin Woolley. *The Queen's Conjuror: The Life and Magic of Dr Dee.*
London: Flamingo (2002).

William Wordsworth (1770–1850). *The Prelude.*