Hilarious Arithmetic

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Working Out

Mathematics has a deserved reputation for being hard work. Mathematics has to be done, has to be worked out, in a way that other intellectual operations do not. If children are enjoined to 'show their workings' in mathematics, that is because mathematics, unlike music, say, or geography, consists in its workings, rather than its outcomes. If the world is indeed written in the language of mathematics, there is labour in that deciphering. And yet there is also no mental discipline which seems more to exemplify Michel Serres's principle that in fact all work amounts to sorting, whether hard, through the physical movement or transformation of things through the expenditure of physical energy, or soft, through the sifting of information or ideas.

The work involved in mathematical procedure is between the soft and the hard. There is always some kind of cost in computational effort involved in the forming of every calculation, whether that calculation be performed by a reluctant fourth-former, or a supercomputer. The idea of infinity means that one can carry on adding one to any number without ever coming to an end. But Brian Rotman has suggested that there is a cost even to the elementary action of counting, and indeed, makes it one of the reasons why he says we must abandon belief in the existence of infinite quantities; for there must come a point a point at which the computing resources necessary simply to keep in mind the largest number ever articulated, and then add 1 to it would exhaust all the energy resources in the universe. There would come a point at which one would be bound to lose count, whatever system were devised for keeping it. Perhaps this is why the Godhead is sometimes identified, not just with the infinite, but with the infinite capacity to keep count: even the very hairs of your head are all numbered, Christ assures us, in a chapter when 'there were gathered together an innumerable multitude of people, insomuch that they trode one upon another' (Luke 12.7, 12.1). The uneasiness of certain groups of believers about the difficulties for God of reassembling bodies that have been dissolved by fire, as in cremation, as compared to bodies that have been kept (as they imagine) relatively intact, as in burial, is the hint of an impious mistrust even among the most pious of the operational limits even of the Good Lord's molecular database.

But it feels as though one need not in fact resort to this kind of operation, which, tellingly perhaps, mathematicians call a 'brute force' operation. It feels as though applying the logical principle that there must always be a 1 that can be added exacts no cost at all, any more than simply and immediately seeing that 2+2=4 does. I can prove that 2+2=4 by counting, but mathematics means not having to count, even if its results depend upon the possibility of this application of brute force in the first or final instance.

Indeed, mathematics operates between these two polarities, of the huge and the minimal, the massive and the negligible, the energetic and the angelic, the quantical and the nonquantical. Indeed, this is the reason that so many scientists, somewhat to the surprise of those in the humanities, insists that mathematics cannot be scientific. For mathematics depends upon, really, in fact, consists in, the generation of proofs, which go (almost) to infinite pains to show that the complex equivalences of quantities and relations made out by calculation have existed all along. The largest known prime number, discovered on 25th January 2014 by Curtis Cooper at the University of Central Missouri, is $2^{57,885,161}$-1. It took 39 days of continuous computing to prove the primality of this number. And yet that considerable outlay of conjoined human and mechanical work yields no outcome that makes any difference to the way things are and always must have been in the world of numbers. The largest prime happens to be one of only 48 known Mersenne primes, that is a prime number formed from 2^n-1, where n is itself a prime number. Like all prime numbers, it has been there all along, and so might perfectly well have been stumbled upon by accident, rather than as a result of the assiduous searches being conducted worldwide by the Great Internet Mersenne Prime Search (GIMPS).

One of the links between comedy and mathematics depends on this strange identity of exertion and ease, of almost everything and scarcely anything. One might even say that there is a kind of drawn-out comedy in the procedure of solving, the effort to show that something is exactly what it was all along. Mathematical proof depends upon demonstrating forms of equation, that depend upon the increasingly radical nonequality of the effort of the proof and its outcome.

If mathematical proofs can be thought of as the solving of puzzles, they can, by the same token, and using almost the same terms, also be seen as having the structure of a joke, according to the terms of the well-known relief theory of comedy. This receives a formulation in the work of Immanuel Kant, who writes in his *Critique of Judgement* that 'Laughter is an affection arising from the sudden transformation of a strained expectation into nothing'. He gives the example of the following joke:

> an Indian at an Englishman's table in Surat, saw a bottle of ale opened, and all the beer turned into froth and flowing out. The repeated exclamations of the Indian showed his great astonishment. 'Well, what is so wonderful in that?' asked the Englishman. 'Oh, I'm not surprised myself,' said the Indian,

> ‘at its getting out, but at how you ever managed to get it all in.’ (Kant 1957, 199-200)

The laughter, such as it is, prompted by this story comes about, says Kant, because ‘the bubble of our expectation was extended to the full and suddenly went off into nothing’ (Kant 1957, 200). There is an interesting wrinkle in this particular example, since the process whereby something comes to nothing in the response to the joke is mirrored by the terms of the joke itself, which is itself precisely about something turning into something that is as good as nothing (froth). It is as though the joke were showing its own workings, which, is no doubt the reason for its utility for Kant, even though he does not mention it.

You will, I am sure, be expecting me to focus in on that word ‘nothing’, and I have no intention of disappointing you, even though disappointment is going to be of the essence in what I will be saying. An expectation is created, then dissipated: a something is suddenly transformed into a nothing. We might say that the simple formula for this operation would be 1–1=0. Subtract something from itself, and the result will be nothing. But the joke as explicated by Kant seems also to accord with another formula, according to which something is shown to be equivalent to nothing, something is shown to have been nothing at all, all along. The formula for this would be 1=0. The issue touched on here, or, as one is tempted to say, in view of the explosive implications, touched off, is the complex one of whether 0 is in fact to be regarded as a number at all. In many instances of comedy, 0 is not so much a particular quantity as the sudden abeyance of the quantitative as such. 0 is not so much a position on the number line, as an intersection of that number line by nonnumericality. If a number signifies something countable, a zero signifies that there is nothing countable. You cannot count zero, you can only take account of its uncountability. Viewed in this way, 0 would not be in the same plane as the other numbers, but perpendicular to number as such.

Kant is intrigued by another aspect of the joke relation, namely the communication in it of two kinds of thing: representation and the body. ‘This transformation, which is certainly not enjoyable to the understanding, yet indirectly gives it very active enjoyment for a moment. Therefore its cause must consist in the influence of the representation upon the body, and the reflex effect of this upon the mind.’ So laughter is not just a violent alternation of contraction and dilation in the muscles, it is an alternation between muscles and, so to speak, the muscles of the mind involved in forming expectations:

> to this sudden transposition of the mind, now to one now to another standpoint in order to contemplate its object, may correspond an alternating tension and relaxation of the elastic portions of our intestines which communicates itself to the diaphragm (like that which ticklish people feel). In connection with this the lungs expel the air at rapidly succeeding intervals, and thus bring about a movement beneficial to health; which

> alone, and not what precedes it in the mind, is the proper cause of the gratification in a thought that at bottom represents nothing

On Kant's account, it is an interchange between the body and the mind, the actual and the represented, form and information, that produces laughter. Kant is followed in this strange economy that connects the physical and the mental by Freud. In his *Jokes and their Relation to the Unconscious* (1905), Freud presents his version of the 'relief theory' proposed by Kant, and others before him. Instead of an expectation suddenly being deflated, Freud proposes that the mechanism of what he calls the 'joke-work', in parallel with the 'dream-work' that he had introduced 5 years previously in *The Interpretation of Dreams* – explains jokes as a specific expectation of an effort of inhibition or repression, which is suddenly removed. Laughter, for Freud, is not a mere incongruity, a friction or tickling of difference, it is a sudden alternation of quantity. But a quantity of what, we may wonder? For no effort seems in fact to be made, only an anticipation or feint of an effort. And yet this potential effort nonetheless seems capable of producing a saving or bonus, when it turns out not to be required. Perhaps the equation for this might be written as: 0 + (1 - 1)= 1. Freud tells a joke, which he is not sure actually counts as a joke, which seems to enact this nonsense economy::

> A gentleman entered a pastry-cook's shop and ordered a cake; but he soon brought it back and asked for a glass of liqueur instead. He drank it and began to leave without having paid. The proprietor detained him. "You've not paid for the liqueur." "But I gave you the cake in exchange for it." "You didn't pay for that either." "But I hadn't eaten it." (Freud 1960, 59)

Words and Numbers

Numbers stand out against words. Numbers and words belong to drastically different orders. This is nicely illustrated by the joke about a man who goes to a monastery where all the jokes have been told so many times that they have been assigned numbers. He says a few numbers at random, and is gratified by polite chuckles from all round the room. When however he ventures on the number 367, the room suddenly erupts into laughter, the monks slap each other on the back, and clutch themselves, wheezing with helpless laughter. When the guffawing eventually subsides, the man asks his guide why 367 was so much funnier than the jokes indicated by other numbers. 'We hadn't heard that one before', he replies.

So this suggests a strange antinomy. Words and numbers connote different kinds of value. Words embody values, they are our way of articulating difference of values. No word is equivalent to any other word. Words embody, that is to say, the principle of the incommensurability of values. Number, on the other hand, allow for the possibility of equivalence. Any number can be rendered exactly and entirely in terms of other numbers, indeed, this is the only way in which a number can be defined. Indeed, numbers embody the necessity of this kind of equivalence. Words mean uniqueness: numbers mean equivalence.

Numbers and words appear to have been pulling apart from each other for some time. And yet there is no number that cannot be articulated as a word, or words, nor any mathematical function that cannot in the end be made articulate in words. Contrariwise, we know that every word can be represented in digital form. So, although words and numbers seem incommensurable, they also in fact interpenetrate; words enclose numbers entirely, and numbers coincide exactly with words. Standing over against numbers, words yet take issue with themselves.

Laughter involves, I dare not yet say invariably derives from, this perturbation, from the seemingly alien presence within language of the kind of indifference or equivalence represented by number.

Elizabeth Sewell has shown in her book *The Field of Nonsense* that the playfulness that is characteristic of nonsense writing depends on the two leading characteristics of number, namely distinctness and seriality; numbering assumes and instances a world of absolutely distinct units, and also assumes and instances the arranegemnt of those units in a series marked by counting. These two principles are so tightly bound together in the simplest mathematical procedures that we do not often notice that they pull in different directions. For seriality embodies absolute incommensurability, since no number can equal another number that occupies a different place in the series; two can never equal three, and four can never equal five. The principle of seriality ensures, not only that all numbers are absolutely distinct, but also that all numbers are absolutely unique.

But the principle of seriality also decrees that all numbers are unique, and therefore absolutely distinct from each other in exactly the same way; that is, they all differ from each other in terms of the units that constitute them. There are three ones in three, and four ones in four; and the 'ones' in each case are absolutely identical and interchangeable. Imagine if, counting from one to four, one had to remember that the intervals between one and two and two and three and three and four were slightly different, and so had to be kept in the right order. But it does not matter a bit what kind of ones are, as we say, 'added up together', since all the 'ones' in question, indeed all 'ones' of any kind, are all the same. So there is no real 'up', since one can add numbers in any direction. In fact, the capacity to order numbers serially, the capacity to count, and therefore the quality which numbers seem to have of allowing or mandating a world of mere numbers, is borrowed from the ordering operation performed upon numbers by the naming of numbers as numerals, or number-words.

There is a story told of the young Benoît Mandelbrot that may dramatise this tension between the serial and the reversible. His class was asked by their teacher to add together all the numbers between one and a hundred. His peers set about this task with pencil and paper, no doubt most of them ordering the numbers in addition columns: 1 + 2 + 3 + 4, and so on. Benoît reflected for a moment or two, then put up his hand. '5050', he said. Where the other children had set out to work through the numbers, Benoît, possessed of a highly-developed capacity to envisage numbers as physical things, had simply looked at the line of numbers from 1 to 100, and recognised that the best place to begin was not at the beginning, but in the middle. Or rather, just after the middle, for he saw that 50 sat next to 51, which, added together, made 101. And, if one took the two numbers that bracketed this pair, 49 and 52, they too added up to 101. And so did the next two numbers out, 48 and 53, just as every other pair would have to, all the way to 2 and 99 and finally 1 and 100. And, since there were exactly fifty such pairs, the required total must be 50 x 101 = 5050. Mandelbrot had performed a calculation by resisting seriality, that is, recognising the indifference to order of the units ordered in the number line. The number line from one to hundred will have many numbers that will seem to a nonmathematical intelligence and indeed to some kind of mathematicians, to be full of hotspots, numbers possessed of particular kinds of significance, no doubt in part because this particular sequence seems to mark the practical limits of the number of years a human being is likely to live. The numbers between 1 and 100 seem possessed of a certain life, a quality that is unevenly distributed across them, the quality of *being* unevenly distributed across them, because they serve so well to count up the years of a life. There might be other reasons for according magical associations to numbers: one might equally live at number 76, or regard 13 as unlucky. All numbers are equal, but, viewed as most human beings do view them, some are more equal than others: because we operate a decimal system, no doubt founded on the convenience of counting on our fingers, tens seem to provide break-points or caesuras, octaves (if I may mix my numerical bases for a moment), in the scale.

This tension between distinction and indistinctness is embodied in the distinction between numerology and numerality. Mathematicians are, perhaps surprisingly, rather drawn to the kind of mystical or magical properties of numbers – it is as though astronomers were to be drawn to the claims of astrology. Indeed, one might say that, in a certain sense, mathematics is a kind of superstitious resistance to the indifference of numbers. A story told by the mathematician G.H Hardy may bear this out. Hardy had become the patron of a brilliant, self-taught Tamil mathematician Srinivasa Ramanujan, whom he helped to bring to England, where he was elected Fellow of Trinity. This is the account given by C.P. Snow in his foreword to Hardy's *A Mathematician's Apology* of a visit paid to Ramanujan when the latter was dying in hospital in Putney in 1920:

> Hardy, always inept about introducing a conversation, said, 'I thought the number of my taxi-cab was 1729. It seemed to me rather a dull number. To which Ramanujan replied: 'No Hardy! No Hardy! It is a very interesting number. It is the smallest number expressible as the sum of two cubes in two different ways' [$1^3 + 12^3$ or $9^3 + 10^3$] (Hardy 1992, 37)

Benoît could see past this clumped or lumpy quality of the number line, which can ordinarily only be smoothed into commensurability by the work of calculation, painfully decomposing 17 or 73 to their constituent units. He not only knew, he could, so to speak, see immediately, that numbers were all absolutely the same. He could see past the differences in quality of numbers to their indifferent equality. This meant that he was able to break the mesmerising spell of the number line itself. It did not make any difference where one started, except that there was one point in the sequence, a sort of cardinal point, just around the middle, where this principle was best illustrated, so that calculation was scarcely needed at all. It seems appropriate that it should be Benoît Mandelbrot who should have identified this principle of self-similarity, since the self-similarity of fractals would be the defining feature of what would be called the Mandelbrot set. This prompts the mathematician's joke: 'What does the B. in "Benoît B. Mandelbrot" stand for? Answer: "Benoît B. Mandelbrot" '.

Samuel Beckett has the character Arsene in his most mathematical novel *Watt* voice something of this same equanimity. Arsene is about to leave the house of Mr Knott, and is delivering himself of a peroration in which he attempts to provide some account of his time in the house and what he has learned from it. What he has learned is precisely that there is nothing, or nothing cumulative to be learned:

> And if I could begin it all over again, knowing what I know now, the result would be the same. And if I could begin again a third time, knowing what I would know then, the result would be the same. And if I could begin it all over again a hundred times, knowing each time a little more than the time before, the result would always be the same, and the hundredth life as the first, and the hundred lives as one. A cat's flux. But at this rate we shall be here all night. (Beckett 1972, 46)

I am not sure that this is exactly a joke in itself, but there is something joke-like in its structure, consisting as it does of an open, accumulation of verbal circumstance that rounds up, or down, to nothingness. But perhaps there is some significance in that 'exactly a joke'; perhaps everything I am saying may be reduced to the observation that when a joke is almost a joke, but not quite, it is not really a joke at all, and when it is, it is absolutely. Comedy is digital; tragedy is analogue.

Dickens is often represented as a writer of imaginative excess, a writer who, in the prodigiousness of his invention, spills exuberantly beyond measure and proportion. Dickens set his face against the grim hedonic calculus of what he took to be utilitarianism (among the few things for which Dickens daily needs forgiveness is the vicious and stupid misunderstanding of utilitarian philosophy he bequeathed to a literary culture that remains smug and ignorant about it), promoting the principles of disproportion and the measureless. And yet he was also a writer who, in his successful exploitation of serial fiction, lived and wrote, literally, by numbers, in thrall to the endlessly-renewed demand that he fill up the 32 printed pages that were required for each monthly part of the novels he wrote over twenty months. Dickens thrived on excess, but it was an excess that he subjected to mathematical control, and that was tightly dependent on mathematical constraints for its quantitative easings. It is said that he measured the success of his legendary readings by the number of ladies who were carried out insensible. And Dickens's comedy, like his writing practice in general, is in fact intertwined and impregnated with number from top to bottom.

There is, for example, the figure of Uncle Pumblechook in *Great Expectations*, who is one of the many tormentors of the infant Pip. As many have observed, Dickens's comedy often depends upon the reduction of character to a single trait or mechanical mannerism. In Pumblechook's case, it is his compulsion to keep Pip up to the mark by means of continuous arithmetic.

> I considered Mr Pumblechook wretched company. Besides being possessed by my sister's idea that a mortifying and penitential character ought to be imparted to my diet – besides giving me as much crumb as possible in combination with as little butter, and putting such a quantity of warm water into my milk that it would have been more candid to have left the milk out altogether – his conversation consisted of nothing but arithmetic. On my politely bidding him Good morning, he said, pompously, 'Seven times nine, boy?' And how should *I* be able to answer, dodged in that way, in a strange place, on an empty stomach! I was hungry, but before I had swallowed a morsel, he began a running sum that lasted all through the breakfast. 'Seven?' 'And four?' 'And eight?' 'And six?' 'And two?' 'And ten?' And so on. And after each figure was disposed of, it was as much as I could do to get a bite or a sup, before the next came; while he sat at his ease guessing nothing, and eating bacon and hot roll, in (if I may be allowed the expression) a gorging and gormandising manner. (Dickens 1965, 84)

Two orders are brought into collision here. First of all, there is the order of eating, measured, as so often in Dickens, with an alternating economy of generosity and niggardliness. Where Jo spoons gravy on to Pip's plate in recompense for the domestic humiliations he must suffer, Pumblechook's homeopathic dilution of the milk of human kindness makes for subtraction where increase should be. Then there is the alternative order of calculation, which, through Pumblechook's renewed inquisition, monopolises the organ of eating, the mouth, which is thereby reduced to a round, empty zero. The ongoing calculation scarcely deserves the name of mental arithmetic, since its effect is to replace eating with inanition, rations with rationality.

It would be easy to cash out the comedy of this passage through a Bergsonian analysis, that would see it as taking revenge on Pumblechook by reducing him to his impulse to impose single-minded and sadistic arithmetic. The more Pumblechook piles on the numbers, the more he is himself unnaturally reduced to a single characteristic, to a unity of being that is in fact only an unnatural fraction of what it ought to mean to be a human being. The notable fact here though is that, as always in such cases, Dickens enters so far into Pumblechook's maniacal mathematics in order to achieve his comic effect. Dickens's narrative plays with the possibility that it might itself get entangled in the idling gears of Pumblechook's meaningless calculation. Pumblechook's improvised tot has no answer or outcome, and the numbers both do and do not matter. If Pumblechook reduces Pip to a number-crunching machine, he, and his narrative are caught in the jaws of the same logic.

Indeed, after this announcement, Pumblechook is represented increasingly as subjected to the process with which he seeks to subjugate Pip:

> we came to Miss Havisham's house, which was of old brick, and dismal, and had a great many iron bars to it. Some of the windows had been walled up; of those that remained, all the lower were rustily barred. There was a courtyard in front, and that was barred; so we had to wait, after ringing the bell, until some one should come to open it. While we waited at the gate, I peeped in (even then Mr. Pumblechook said, 'And fourteen?' but I pretended not to hear him). (Dickens 1965, 84-5)

Dismissed from the gate by the pert Estella, Pumblechook attempts to regain some of his crumpled dignity with a parting bit of moralism:

> [he] departed with the words reproachfully delivered: "Boy! Let your behavior here be a credit unto them which brought you up by hand!" I was not free from apprehension that he would come back to propound through the gate, 'And sixteen?' But he didn't. (Dickens 1965, 85)

As so often in Dickens, the running joke of Pumblechook's running sum is brought to a kind of reckoning, when Pip returns from Miss Havisham's and is reluctant to reveal what has occurred there:

> 'First (to get our thoughts in order): Forty-three pence?'
>
> I calculated the consequences of replying 'Four Hundred Pound,' and finding them against me, went as near the answer as I could – which was somewhere about eightpence off. Mr Pumblechook then put me through my pence-table from 'twelve pence make one shilling,' up to 'forty pence make three and fourpence,' and then triumphantly demanded, as if he had done for me, '*Now*! How much is forty-three pence?' To which I replied, after a long interval of reflection, 'I don't know.' And I was so aggravated that I almost doubt if I did know.
>
> Mr. Pumblechook worked his head like a screw to screw it out of me, and said, 'Is forty-three pence seven and sixpence three fardens, for instance?'

> 'Yes!' said I. And although my sister instantly boxed my ears, it was highly gratifying to me to see that the answer spoilt his joke, and brought him to a dead stop. (Dickens 1965, 96)

Pumblechook thinks to have finished Pip off with his inquisition, but it is really Pip who, in the detail slyly insinuated by his author, has 'calculated the consequences'. By refusing to take the sum seriously, Pip exposes Pumblechook to the indifference of number that he has himself been wielding as a weapon. The principle that Pumblechook brings to bear on Pip, namely of reducing everything to number, is itself applied to him. There are two competing orders of arithmetic, just as there are two jokes: Pumblechook's and Pip's, which 'spoilt his joke and brought him to a dead stop'.

At the beginning of his book on laughter, Bergson helps us to recognise an important aspect of this kind of satirical humour, when he points to the strange equanimity that is essential to the comic impulse:

> I would point out… the absence of feeling which usually accompanies laughter. It seems as though the comic could not produce its disturbing effect unless it fell, so to say, on the surface of a soul that is thoroughly calm and unruffled. Indifference is its natural environment, for laughter has no greater foe than emotion…. the comic demands something like a momentary anesthesia of the heart. Its appeal is to intelligence, pure and simple. (Bergson 1914, 4-5)

We may perhaps describe feelings as the embodiment of values: feelings are the way in which we enact the fact and the manner of things mattering to us. The equatability or equivalence of all values that is characteristic of the numerical suggests to Bergson a world without feeling, a world of pure intelligence:

> In a society composed of pure intelligences there would probably be no more tears, though perhaps there would still be laughter; whereas highly emotional souls, in tune and unison with life, in whom every event would be sentimentally prolonged and re-echoed, would neither know nor understand laughter. (Bergson 1914, 4)

The work in which Beckett comes closest to immersing himself and his reader in the destructive equanimity of number is surely *Watt* and, within that novel of obsessive accumulations, permutations and calculations, the most sustained exercise in mathematised narrative is the episode, allegedly recounted by Arthur to Watt and others in Mr Knott's garden, which deals with the appearance before a College committee of Ernest Louit, accompanied by what he claims to be a mathematical savant from the far West of Ireland, in order to account for the £50 of college funds that he has expended in research for the dissertation he entitles *The Mathematical Intuitions of the Visicelts*.

Louit has plainly put the research grant advanced to him by the College to other uses than the investigation of mathematical capacities among the indigent indigenes of the County Clare (for the amazement of whom £5.00 has been set aside in his budget for the purchase of 'coloured beads'). In a sense, the entire episode is an attempt to supply an alternative, and extravagantly inflationary budget in place of the simple account of how the money has in fact been spent. Numbers begin early on to take the place of words:

> The College Bursar now wondered, on behalf of the committee, if it would be convenient to Mr. Louit to give some account of the impetus imparted to his studies by his short stay in the country. Louit replied that he would have done so with great pleasure if he had not had the misfortune to mislay, on the very morning of his departure from the west, between the hours of eleven and midday, in the gentlemen's cloakroom of Ennis railway-station, the one hundred and five loose sheets closely covered on both sides with shorthand notes embracing the entire period in question. This represented, he added, an average of no less than five pages, or ten sides, per day. He was now exerting himself to the utmost, and indeed he feared greatly beyond his strength, with a view to recuperating his MS., which, qua MS., could not be of the smallest value to any person other than himself and, eventually, humanity. (Beckett 172, 171)

Numbers begin also to infiltrate the account of the enquiry, first of all in the account provoked by the seemingly harmless statement that 'The committee… began to look at one another', followed immediately by the odd and ominous qualification, 'and much time passed, before they succeeded in doing so'. As so often in Watt, a simple proposition detonates a long chain of permutational reasoning:

> when five men look at one another, though in theory only twenty looks are necessary, every man looking four times, yet in practice this number is seldom sufficient, on account of the multitude of looks that go astray. For example, Mr. Fitzwein looks at Mr. Magershon, on his right. But Mr. Magershon is not looking at Mr. Fitzwein, on his left, but at Mr. O'Meldon, on his right. But Mr. O'Meldon is not looking at Mr. Magershon, on his left, but, craning forward, at Mr. MacStern, on his left but three at the far end of the table. But Mr. MacStern is not craning forward looking at Mr. O'Meldon, on his right but three at the far end of the table, but is sitting bolt upright looking at Mr. de Baker, on his right. But Mr. de [173-4] Baker is not looking at Mr. MacStern, on his left, but at Mr. Fitzwein, on his right. Then Mr. Fitzwein, tired of looking at the back of Mr. Magershon's head, cranes forward and looks at Mr. O'Meldon, on his right but one at the end of the table. (Beckett 1972, 173-4)

The only solution to the irrational waste and blunder of all these wildly misdirected eyebeams is, our author tells us, is for a committee to mathematise the process of looking at itself, by assigning each committee member a number.

> Then, when the time comes for the committee to look at itself, let all the members but number one look together at number one, and let number one look at them all in turn, and then close, if he cares to, his eyes, for he has done his duty. Then of all those members but number one who have looked together at number one, and by number one been looked at one by one, let all but number two look at number two, and let number two in his turn look at them all in turn, and then remove, if his eyes are sore, his glasses, if he is in the habit of wearing glasses, and rest his eyes, for they are no longer required, for the moment. Then of all those members but number two, and of course number one, who have looked together at number two, and by number two been looked at one by one, let all with the exception of' number three look together at number three, and let number three in his turn look at them all in turn, and then get up and go to the window and look out, if he feels like a little exercise and change of scene, for he is no longer needed, for the time being. Then of all those members of the committee with the exception of number three, and of course of numbers two and one, who have looked together at number three and by number three been looked at one by one, let all save number four look at number four, and let number four in his turn look at them one [178-9] after another, and then gently massage his eyeballs, if he feels the need to do so, for their immediate role is terminated. And so on, until only two members of the committee remain, whom then let at each other look, and then bathe their eyes, if they have their eyebaths with them, with a little laudanum, or weak boracic solution, or warm weak tea, for they have well deserved it. Then it will be found that the committee has looked at itself in the shortest possible time, and with the minimum number of looks, that is to say x squared minus x looks if there are x members of the committee, and y squared minus y if there are y. (Beckett 1972, 178-9)

The text depends upon the struggle between words and numbers. This might approximate to a struggle between temporality, for words, at least in their condition as utterance must transpire in time, and spatiality. Actually, we should acknowledge that this is a conflict that exists within mathematics, in the relation between the formula and the proof, the quod and the demonstrandum. Unless, perhaps, mathematics is nothing else but this tension between what is and the working out of what is; God, outside time, presumably does not do mathematics, since he knows the answers already – though Wittgenstein wonders 'Can God know all the places of the expansion of π?' (Wittgenstein 1975, 128). The work of *Watt* is to rotate the mathematically simultaneous into the wordy dimension of the consecutive, and then back again. Linearity, by which is really meant irreversibility, is repeatedly folded back into reversibility. The filling of space by oscillation and alternation takes the place of onward movement from one point to another, meaning that the space of the novel is occupied rather than traversed. Numbers are able to order the world in the way they do precisely because they make the order, in the sense of the order of succession of things, irrelevant. This process is announced in *Alice in Wonderland*:

> 'What do you know about this business?' the King said to Alice.
>
> 'Nothing,' said Alice.
>
> 'Nothing whatever?' persisted the King.
>
> 'Nothing whatever,' said Alice.
>
> 'That's very important,' the King said, turning to the jury. They were just beginning to write this down on their slates, when the White Rabbit interrupted: '*Un*important, your Majesty means, of course,' he said in a very respectful tone, but frowning and making faces at him as he spoke.
>
> '*Un*important, of course, I meant,' the King hastily said, and went on to himself in an undertone, `important – unimportant – unimportant – important – ' as if he were trying which word sounded best. (Carroll 1971, 104)

The Louit episode in *Watt* is full of doubled and multiplied words: 'yes yes', 'no no', haha' 'come come' 'oh no no no no no'. Words are not numbered, but numerous. And the principle of reversibility is also powerfully in evidence. Beckett's drafts indicate that Mr. Nackybal's name is a derivation from Caliban, itself of course an adjustment of Cannibal. Nackybal is converted in the episode to Ballynack and Nackynack. Cannibalism seems to be a metaphor for the churning of elements in the episode. Louit explains that hunger has forced him to roast and eat his faithful dog O'Connor, leaving only his bones, and Beckett refrains perhaps with difficulty from concluding this story with the traditional ending, which would have had Louit lamenting: 'A pity O'Connor isn't here; he'd have loved these bones.' (Ackerley 2005, 160-1).

Our humanistic prejudices incline us to say that words are here being reduced to the inhuman definiteness of numbers, but Beckett's text is determined to show us something like the reverse, that to numerise is to defer the possibility of making any final or finite statement. Insofar as it passes through number, the pursuit of completeness or absolute truth will always be put at infinite risk.

The arts, self-identifying as they, possibly we, are with the indefinite, the open, and the fluidly non-absolute, are inclined to view scientific reasoning as paralysed by abstraction and a kind of false, inhuman positivity. In fact, though, there are reasons to suspect the arts of confusing absoluteness with exactitude. It is in fact approximation that allows for absoluteness. This is well illustrated in the story of the researcher seeking responses from different kinds of academic to the suggestion that all odd numbers are primes. The mathematician says: '1 is prime, 3 is prime, 5 is prime, 7 is prime, 9 is not prime. The conjecture is false.' The physicist says: '1 is prime, 3 is prime, 5 is prime, 7 is prime, 9 is not prime, 11 is prime, 13 is prime. Within acceptable limits of measurement error, the conjecture holds.' The literary critic says: '1 is prime, 3 is prime, 5 is prime, 7 is prime, 9 is prime – it's true! All odd numbers *are* prime!'

Mathematics has the reputation of being more economical and less wasteful than words, but it is words that encourage us impatiently to square things off and round things up into always approximative absoluteness. Words save time, the time that numbers are. But at this rate we shall be here all night.

Laughing By Numbers

My proposal is that laughter is produced from the friction and fission of the positive values that are put into play by the joke-work and the pure negativity, that negativity that is best embodied by number, that intersects with them. Things that matter suddenly come to nothing, are suddenly made to be things that do not matter at all; nonequivalence is rotated suddenly into absolute equivalence. Equivalence is not just nothingness. It can also be considered as a kind of null infinity, for the equivalence of numbers, their capacity to be manipulated and reversed and recombined, means that there is no end to the equivalences of number, which are therefore indifferently everything and nothing.

The most surprising reversal in this is that it is now the order of words that signifies the positivity of meaning, or value. The order of numbers, by contrast, signifies, not the quantifiable, but the nonquantifiable, the nothing-at-all that is equivalent to anything-at-all. So, unexpectedly, it is number that represents the eruption of the nonquantical into the order of the quantical, of equality into quality. Just as the sign for zero seems to be the intersection of the order of numbers and the nonnumerical, so numbers can act as the intersection of the positive qualities signified by words, and the indifference of number. If nothing is the other of number, than number is the nothingness that is the other of words, that nevertheless is powerfully at work within words. Number is the other of words that words themselves harbour, with hilarity the outcome of its demonstration.

G.H Hardy himself suggests something of this near-nihilism that exists within number, in his final estimations of the value of his own mathematical life:

> I have never done anything 'useful'. No discovery of mine has made, or is likely to make, directly or indirectly, for good or ill, the least difference to the amenity of the world. I have helped to train other mathematicians, but

> mathematicians of the same kind as myself, and their work has been, so far at any rate, as I have helped them to it, as useless as my own. Judged by all practical standards, the value of my mathematical life is nil; and outside mathematics it is trivial anyhow. (Hardy 1992, 150-1)

Others might be inclined to see this as a claim for the intrinsic value of an intellectual enterprise, rather than its instrumental value, but it is notable that Hardy insists that this almost-nullity is nevertheless to be measured numerically:

> The case for my life, then, or for that of anyone else who has been a mathematician in the same sense which I have been one is this; that I have added something to knowledge, and helped others to add more; and that these somethings have a value which differs in degree only and not in kind, from that of the creations of the great mathematicians, or of any of the great artists, great or small, who have left some kind of memorial behind them. (Hardy 1992, 151)

Our complacent assumption is that laughter has something to do with our triumph over the inert, that it is life asserting its claims against the givenness or dead necessity of things. But the strong implication of the mathematically-driven comedy I have considered here suggests that this cannot be the whole story. For the implication of number and pure quantity in comedy suggests that it must at least include some insurgence of the inert, an assertion of the purely quantical against the world of quality. We do not merely laugh at number, we also laugh by numbers. To grasp this properly, we need to recognise that number is itself plural. There is the kind of number we use to count with, and therefore to assign values, for example by maintaining the difference between the one and the many. This is number in the service of difference, number that we can count on, especially in the operation that Badiou calls 'counting as one'. But I have wanted to show that there is another vector or dimension of number. This is the giddiness of number as pure, unrelieved and, so to speak, indifferent differentiation. To be sure, there is a kind of dissolute exhilaration in this indifference, but there is a horror too – the horror of losing count, of being given over to number without being able to count on it. This is not life asserted against death, but death come uncountably, unaccountably, to life. It is not death driven back by life, but life inundated by the death of the indifferent. Laughter is not gaiety in the face of death, but death itself made gayous.

Beckett's laughter appears like a relief from what surrounds it, and therefore the guarantee that things are not really as serious as all that. But the refusal to contain laughter comes to the same thing as the refusal to allow it. This is not a laughter that punctures logic, but one that steps into its place. *Watt* becomes a mechanical laughter-machine, an algorithmic *risus sardonicus* that does not undo death but rather does its grim, grinning work.

We work so hard at laughter in order to overcome it, rather than to overcome with it. If laughter comes from the eruption of nothing in the place of something, laughter is also the defence against the propagation of this nothing. Where laughter propagates, we seek through our routines of comedy – in the regulated rhythms of the joke, for example – to contain, drain and exhaust it. We laugh to fend off death by laughing, we laugh to have done with laughing, in a controlled explosion rather than a general conflagration. Laughter is a binding together of the fabric that laughing itself looses. That is why laughter, apparently and allegedly the dissolution of power, in fact works to solidify and concentrate it. Laughter is less colonic irrigation than colonial occupation. A wise lecturer takes care to laugh his lecturees into concupiscent acquiescence. The urge to pass a joke on is the urge of the crowd to become more of a crowd, to exclude nothing that it does not already contain.

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