

*He knew what's what, and that's as high  
As metaphysic wit can fly.*

SAMUEL BUTLER (*Hudibras*)

### 3 Geometry in the South Pacific

By SYLVIA TOWNSEND WARNER

[EXCERPT FROM "MR. FORTUNE'S MAGGOT"]

AND then one morning when they had been living in the new hut for about six weeks he [Mr. Fortune] woke up inspired. Why had he wasted so much time displaying his most trivial and un compelling charms, opposing to the magnetism of death such fripperies and titbits of this world, such gewgaws of civilization as a path serpentine to a parrot-cote (a parrot-cote which hadn't even allured the parrots), or a pocket magnifying glass, while all the time he carried within him the inestimable treasures of intellectual enjoyment? Now he would pipe Lueli a tune worth dancing to, now he would open for him a new world. He would teach him mathematics.

He sprang up from bed, full of enthusiasm. At the thought of all those stretches of white beach he was like a bridegroom. There they were, hard and smooth from the tread of the sea, waiting for that noble consummation of blank surfaces, to show forth a truth; waiting, in this particular instance, to show forth the elements of plane geometry.

At breakfast Mr. Fortune was so glorified and gay that Lueli caught a reflection of his high spirits and began to look more life-like than he had done for weeks. On their way down to the beach they met a party of islanders who were off on a picnic. Mr. Fortune with delight heard Lueli answering their greetings with something like his former sociability, and even plucking up heart enough for a repartee. His delight gave a momentary stagger when Lueli decided to go a-picnicking too. But, after all, it didn't matter a pin. The beach would be as smooth again to-morrow, the air as sweet and nimble; Lueli would be in better trim for learning after a spree, and, now he came to think of it, he himself wouldn't teach any the worse for a little private rubbing-up beforehand.

It must be going on for forty years since he had done any mathematics; for he had gone into the Bank the same year that his father died, leaving Rugby at seventeen because, in the state that things were then in, the Bank was too good an opening to be missed. He had once got a prize—The Poetical Works of Longfellow—for Algebra, and he had scrambled along well enough in other branches of mathematics; but he had not learnt with

any particular thrill or realized that thrill there might be until he was in the Bank, and learning a thing of the past.

Then, perhaps because of that never-ending entering and adding up and striking balances, and turning on to the next page to enter, add up and strike balances again, a mental occupation minute, immediate and yet, so to speak, wool-gathering, as he imagined knitting to be, the absolute quality of mathematics began to take on for him an inexpressibly romantic air. "Pure Mathematics." He used to speak of them to his fellow clerks as though he were hinting at some kind of transcendental debauchery of which he had been made free—and indeed there does seem to be a kind of unnatural vice in being so completely pure. After a spell of this holy boasting he would grow a little uneasy; and going to the Free Library he took out mathematical treatises, just to make sure that he could follow step by step as well as soar. For twenty pages perhaps, he read slowly, carefully, dutifully, with pauses for self-examination and working out the examples. Then, just as it was working up and the pauses should have been more scrupulous than ever, a kind of swoon and ecstasy would fall on him, and he read ravening on, sitting up till dawn to finish the book, as though it were a novel. After that his passion was stayed; the book went back to the Library and he was done with mathematics till the next bout. Not much remained with him after these orgies, but something remained: a sensation in the mind, a worshipping acknowledgment of something isolated and unassailable, or a remembered mental joy at the rightness of thoughts coming together to a conclusion, accurate thoughts, thoughts in just intonation, coming together like unaccompanied voices coming to a close.

But often his pleasure flowered from quite simple things that any fool could grasp. For instance he would look out of the bank windows, which had green shades in their lower halves; and rising above the green shades he would see a row of triangles, equilateral, isosceles, acute-angled, right-angled, obtuse-angled. These triangles were a range of dazzling mountain peaks, eternally snowy, eternally untrodden; and he could feel the keen wind which blew from their summits. Yet they were also a row of triangles, equilateral, isosceles, acute-angled, right-angled, obtuse-angled.

This was the sort of thing he designed for Lueli's comfort. Geometry would be much better than algebra, though he had not the same certificate from Longfellow for teaching it. Algebra is always dancing over the pit of the unknown, and he had no wish to direct Lueli's thoughts to that quarter. Geometry would be best to begin with, plain plane geometry, immutably plane. Surely if anything could minister to the mind diseased it would be the steadfast contemplation of a right angle, an existence that no mist of human tears could blur, no blow of fate deflect.

Walking up and down the beach, admiring the surface which to-morrow

with so much epiphany and glory was going to reveal the first axioms of Euclid, Mr. Fortune began to think of himself as possessing an universal elixir and charm. A wave of missionary ardour swept him along and he seemed to view, not Lueli only, but all the islanders rejoicing in this new dispensation. There was beach-board enough for all and to spare. The picture grew in his mind's eye, somewhat indebted to Raphael's Cartoon of the School of Athens. Here a group bent over an equation, there they pointed out to each other with admiration that the square on the hypotenuse equalled the sum of the squares on the sides containing the right angle; here was one delighting in a rhomboid and another in conic sections, that enraptured figure had secured the twelfth root of two, while the children might be filling up the foreground with a little long division.

By the morrow he had slept off most of his fervour. Calm, methodical, with a mind prepared for the onset, he guided Lueli down to the beach and with a stick prodded a small hole in it.

"What is this?"

"A hole."

"No, Lueli, it may seem like a hole, but it is a point."

Perhaps he had prodded a little too emphatically. Lueli's mistake was quite natural. Anyhow, there were bound to be a few misunderstandings at the start.

He took out his pocket knife and whittled the end of the stick. Then he tried again.

"What is this?"

"A smaller hole."

"Point," said Mr. Fortune suggestively.

"Yes, I mean a smaller point."

"No, not quite. It is a point, but it is not smaller. Holes may be of different sizes, but no point is larger or smaller than another point."

Lueli looked from the first point to the second. He seemed to be about to speak, but to think better of it. He removed his gaze to the sea.

Meanwhile, Mr. Fortune had moved about, prodding more points. It was rather awkward that he should have to walk on the beach-board, for his footmarks distracted the eye from the demonstration.

"Look, Lueli!"

Lueli turned his gaze inland.

"Where?" said he.

"At all these. Here; and here; and here. But don't tread on them."

Lueli stepped back hastily. When he was well out of the danger-zone he stood looking at Mr. Fortune with great attention and some uneasiness.

"These are all points."

Lueli recoiled a step further. Standing on one leg he furtively inspected the sole of his foot.

"As you see, Lueli, these points are in different places. This one is to the west of that and consequently that one is to the east of this. Here is one to the south. Here are two close together, and there is one quite apart from all the others. Now look at them, remember what I have said, think carefully and tell me what you think."

Inclining his head and screwing up his eyes Lueli inspected the demonstration with an air of painstaking connoisseurship. At length he ventured the opinion that the hole lying apart from the others was perhaps the neatest. But if Mr. Fortune would give him the knife he would whittle the stick even finer.

"Now what did I tell you? Have you forgotten that points cannot be larger or smaller? If they were holes it would be a different matter. But these are points. Will you remember that?"

Lueli nodded. He parted his lips, he was about to ask a question. Mr. Fortune went on hastily.

"Now suppose I were to cover the whole beach with these: what then?"

A look of dismay came over Lueli's countenance. Mr. Fortune withdrew the hypothesis.

"I don't intend to. I only ask you to imagine what it would be like if I did."

The look of dismay deepened.

"They would all be points," said Mr. Fortune, impressively. "All in different places. And none larger or smaller than another.

"What I have explained to you is summed up in the axiom: a point has position but not magnitude. In other words if a given point were not in a given place it would not be there at all."

Whilst allowing time for this to sink in he began to muse about those other words. Were they quite what he meant? Did they indeed mean anything? Perhaps it would have been better not to try to supplement Euclid. He turned to his pupil. The last words had sunk in at any rate, had been received without scruple and acted upon. Lueli was out of sight.

Compared with his intentions actuality had been a little quelling. It became more quelling as time went on. Lueli did not again remove himself without leave; he soon discovered that Mr. Fortune was extremely in earnest, and was resigned to regular instruction every morning and a good deal of rubbing-in and evocation during the rest of the day. No one ever had a finer capacity for listening than he, or a more docile and obliging temperament. But whereas in the old days these good gifts had flowed from him spontaneously and pleasurably he now seemed to be exhibiting them by rote and in a manner almost desperate, as though he were listening and obliging as a circus animal does its tricks. Humane visitors to circuses often point out with what alacrity the beasts run into the ring to perform their turn. They do not understand that in the choice

of two evils most animals would rather flourish round a spacious ring than be shut up in a cage. The activity and the task is a distraction from their unnatural lot, and they tear through paper hoops all the better because so much of their time is spent behind iron bars.

It had been a very different affair when Lueli was learning Bible history and the Church Catechism, *The King of Love my Shepherd is* and *The Old Hundredth*. Then there had been no call for this blatant submission; lessons had been an easy-going conversation, with Lueli keeping his end up as an intelligent pupil should and Mr. Fortune feeling like a cross between wise old Chiron and good Mr. Barlow. Now they were a succession of harangues, and rather strained harangues to boot. Theology, Mr. Fortune found, is a more accommodating subject than mathematics; its technique of exposition allows greater latitude. For instance when you are gravelled for matter there is always the moral to fall back upon. Comparisons too may be drawn, leading cases cited, types and antetypes analysed and anecdotes introduced. Except for Archimedes mathematics is singularly naked of anecdotes.

Not that he thought any the worse of it for this. On the contrary he compared its austere and integral beauty to theology decked out in her flaunting charms and wielding all her bribes and spiritual bonuses; and like Dante at the rebuke of Beatrice he blushed that he should ever have followed aught but the noblest. No, there was nothing lacking in mathematics. The deficiency was in him. He added line to line, precept to precept; he exhausted himself and his pupil by hours of demonstration and exposition; leagues of sand were scarred, and smoothed again by the tide, and scarred afresh: never an answering spark rewarded him. He might as well have made the sands into a rope-walk.

Sometimes he thought that he was taxing Lueli too heavily, and desisted. But if he desisted for pity's sake, pity soon drove him to work again, for if it were bad to see Lueli sighing over the properties of parallel lines, it was worse to see him moping and pining for his god. Teioa's words, uttered so matter-of-factly, haunted his mind. "I expect he will die soon." Mr. Fortune was thinking so too. Lueli grew steadily more lacklustre, his eyes were dull, his voice was flat; he appeared to be retreating behind a film that thickened and toughened and would soon obliterate him.

"If only, if only I could teach him to enjoy an abstract notion! If he could once grasp how it all hangs together, and is everlasting and harmonious, he would be saved. Nothing else can save him, nothing that I or his fellows can offer him. For it must be new to excite him and it must be true to hold him, and what else is there that is both new and true?"

There were women, of course, a race of beings neither new nor true, yet much vaunted by some as a cure for melancholy and a tether for the

soul. Mr. Fortune would have cheerfully procured a damsel (not that they were likely to need much of that), dressed her hair, hung the whistle and the Parnell medal round her neck, dowered her with the nineteen counters and the tape measure and settled her in Lueli's bed if he had supposed that this would avail. But he feared that Lueli was past the comfort of women, and in any case that sort of thing is best arranged by the parties concerned.

So he resorted to geometry again, and once more Lueli was hurling himself with frantic docility through the paper hoops. It was really rather astonishing, how dense he could be! Once out of twenty, perhaps, he would make the right answer. Mr. Fortune, too anxious to be lightly elated, would probe a little into his reasons for making it. Either they were the wrong reasons or he had no reasons at all. Mr. Fortune was often horribly tempted to let a mistake pass. He was not impatient: he was far more patient than in the palmiest days of theology—but he found it almost unendurable to be for ever saying with various inflexions of kindness: "No, Lueli. Try again," or: "Well, no, not exactly," or: "I fear you have not quite understood," or: "Let me try to make that clearer." He withstood the temptation. His easy acceptance (though in good faith) of a sham had brought them to this pass, and tenderness over a false currency was not likely to help them out of it. No, he would not be caught that way twice. Similarly he pruned and repressed Lueli's talent for leaking away down side-issues, though this was hard too, for it involved snubbing him almost every time he spoke on his own initiative.

Just as he had been so mistaken about the nature of points, confounding them with holes and agitating himself at the prospect of a beach pitted all over, Lueli contrived to apply the same sort of well-meaning misconceptions to every stage of his progress—if progress be the word to apply to one who is hauled along in a state of semiconsciousness by the scruff of his neck. When the points seemed to be tolerably well-established in his mind Mr. Fortune led him on to lines, and by joining up points he illustrated such simple figures as the square, the triangle and the parallelogram. Lueli perked up, seemed interested, borrowed the stick and began joining up points too. At first he copied Mr. Fortune, glancing up after each stroke to see if it had been properly directed. Then growing rather more confident, and pleased—as who is not?—with the act of drawing on sand, he launched out into a more complicated design.

"This is a man," he said.

Mr. Fortune was compelled to reply coldly:

"A man is not a geometrical figure."

At length Mr. Fortune decided that he had better take in sail. Pure mathematics were obviously beyond Lueli; perhaps applied mathematics

would work better. Mr. Fortune, as it happened, had never applied any, but he knew that other people did so, and though he considered it a rather lower line of business he was prepared to try it.

"If I were to ask you to find out the height of that tree, how would you set about it?"

Lueli replied with disconcerting readiness:

"I should climb up to the top and let down a string."

"But suppose you couldn't climb up it?"

"Then I should cut it down."

"That would be very wasteful: and the other might be dangerous. I can show you a better plan than either of those."

The first thing was to select a tree, an upright tree, because in all elementary demonstrations it is best to keep things as clear as possible. He would never have credited the rarity of upright trees had he not been pressed to find one. Coco-palms, of course, were hopeless: they all had a curve or a list. At length he remembered a tree near the bathing-pool, a perfect specimen of everything a tree should be, tall, straight as a die, growing by itself; set apart, as it were, for purposes of demonstration.

He marched Lueli thither, and when he saw him rambling towards the pool he recalled him with a cough.

"Now I will show you how to discover the height of that tree. Attend. You will find it very interesting. The first thing to do is to lie down."

Mr. Fortune lay down on his back and Lueli followed his example.

Many people find that they can think more clearly in a recumbent position. Mr. Fortune found it so too. No sooner was he on his back than he remembered that he had no measuring stick. But the sun was delicious and the grass soft; he might well spare a few minutes in exposing the theory.

"It is all a question of measurements. Now my height is six foot two inches, but for the sake of argument we will assume it to be six foot exactly. The distance from my eye to the base of the tree is so far an unknown quantity. My six feet however are already known to you."

Now Lueli had sat up, and was looking him up and down with an intense and curious scrutiny, as though he were something utterly unfamiliar. This was confusing, it made him lose the thread of his explanation. He felt a little uncertain as to how it should proceed.

Long ago on dark January mornings, when a septic thumb (bestowed on him by a cat which he had rescued from a fierce poodle) obliged him to stay away from the Bank, he had observed young men with woollen comforters and raw-looking wind-bitten hands practising surveying under the snarling elms and whimpering poplars of Finsbury Park. They had tapes and tripods, and the girls in charge of perambulators dawdled on the asphalt paths to watch their proceedings. It was odd how vividly frag-

ments of his old life had been coming back to him during these last few months.

He resumed:

"In order to ascertain the height of the tree I must be in such a position that the top of the tree is exactly in a line with the top of a measuring-stick—or any straight object would do, such as an umbrella—which I shall secure in an upright position between my feet. Knowing then that the ratio that the height of the tree bears to the length of the measuring-stick must equal the ratio that the distance from my eye to the base of the tree bears to my height, and knowing (or being able to find out) my height, the length of the measuring stick and the distance from my eye to the base of the tree, I can, therefore, calculate the height of the tree."

"What is an umbrella?"

Again the past flowed back, insurgent and actual. He was at the Oval, and out of an overcharged sky it had begun to rain again. In a moment the insignificant tapestry of lightish faces was exchanged for a noble pattern of domes, blackish, blueish and greenish domes, sprouting like a crop of miraculous and religious mushrooms. The rain fell harder and harder, presently the little white figures were gone from the field and, as with an abnegation of humanity, the green plain, so much smaller for their departure, lay empty and forsaken, ringed round with tier upon tier of blackly glistening umbrellas.

He longed to describe it all to Lueli, it seemed to him at the moment that he could talk with the tongues of angels about umbrellas. But this was a lesson in mathematics: applied mathematics, moreover, a compromise, so that all further compromises must be sternly nipped. Unbending to no red herrings he replied:

"An umbrella, Lueli, when in use resembles the—the shell that would be formed by rotating an arc of curve about its axis of symmetry, attached to a cylinder of small radius whose axis is the same as the axis of symmetry of the generating curve of the shell. When not in use it is properly an elongated cone, but it is more usually helicoidal in form."

Lueli made no answer. He lay down again, this time face downward.

Mr. Fortune continued: "An umbrella, however, is not essential. A stick will do just as well, so find me one, and we will go on to the actual measurement."

Lueli was very slow in finding a stick. He looked for it rather languidly and stupidly, but Mr. Fortune tried to hope that this was because his mind was engaged on what he had just learnt.

Holding the stick between his feet, Mr. Fortune wriggled about on his back trying to get into the proper position. He knew he was making a fool of himself. The young men in Finsbury Park had never wriggled about on their backs. Obviously there must be some more dignified way of



getting the top of the stick in line with the top of the tree and his eye, but just then it was not obvious to him. Lueli made it worse by standing about and looking miserably on. When he had placed himself properly he remembered that he had not measured the stick. It measured (he had had the forethought to bring the tape with him) three foot seven, very tiresome: those odd inches would only serve to make it seem harder to his pupil. So he broke it again, drove it into the ground, and wriggled on his stomach till his eye was in the right place, which was a slight improvement in method, at any rate. He then handed the tape to Lueli, and lay strictly motionless, admonishing and directing while Lueli did the measuring of the ground. In the interests of accuracy he did it thrice, each time with a different result. A few minutes before noon the height of the tree was discovered to be fifty-seven foot, nine inches.

Mr. Fortune now had leisure for compassion. He thought Lueli was looking hot and fagged, so he said:

“Why don’t you have a bathe? It will freshen you up.”

Lueli raised his head and looked at him with a long dubious look, as though he had heard the words but without understanding what they meant. Then he turned his eyes to the tree and looked at that. A sort of shadowy wrinkle, like the blurring on the surface of milk before it boils, crossed his face.

“Don’t worry any more about that tree. If you hate all this so much we won’t do any more of it, I will never speak of geometry again. Put it all out of your head and go and bathe.”