> scientists sat in stunned silence, von Neumann reeled off the various steps which would provide the solution. . . . Having risen to this routine challenge, von Neumann followed up with a routine suggestion: Let's go to lunch.

At one research establishment, it had been decided to remit a problem to Johnny's mental mathematics, but in the intervening period a staffer with a calculating machine spent the best part of a night and solved it. When the question was put to Johnny, he stared at the ceiling and said "the first step is to calculate . . ." While he was in mid-mutter, the staffer suggested that the right answer was such and such. Johnny went on muttering and then said with surprise, "That is correct." Later, it was explained to him that the staffer had spent several hours on what took him five minutes. Otherwise, claimed his friends (probably libelously, for he really was not petty), Johnny might have sulked for weeks.

When he was given a problem while standing, Johnny at one stage would dance from foot to foot. Although this practice caused some spills at his crowded cocktail parties, it forms one of the best stories half against him: his reaction to the fly puzzle. Two bicyclists are 20 miles apart and head toward each other at 10 miles per hour each. At the same time a fly traveling at a steady 15 miles per hour starts from the front wheel of the northbound bicycle. It lands on the front wheel of the southbound bicycle, and then instantly turns around and flies back, and after next landing instantly flies north again. Question: What total distance did the fly cover before it was crushed between the two front wheels?

The slow way of answering is to calculate the distance that the fly travels on its first trip to the southbound front wheel, then the distance it travels on its next trip to the northbound wheel, and finally to sum the infinite series so obtained. It is extraordinary how many mathematicians can be fooled into doing that long sum. The short way is to note that the bicycles will meet exactly an hour after starting, by which time the 15-miles-per-hour fly must have covered 15 miles. When the question was put to Johnny, he danced and answered immediately, "15 miles." "Oh, you've heard

the trick before," said the disappointed questioner. "What trick?" asked the puzzled Johnny. "I simply summed the infinite series." It is worth adding that, when ribbed on this later, Johnny said "the figures actually put to me were not so simple."

When he was asked a question on the hoof, Johnny would put his hands behind his back and work out sums while moving forward in a strange waddle—"moving in small steps with considerable random acceleration, but never at great speed." He once calculated how much heat would have been absorbed into a square meter of earth, apparently when there was a question of whether it would be safe to pick up a metal object that had been left in the sun most of the day. "Well," said Johnny, waddling toward it, "the sun's heat at its surface is . . ." He had calculated before he reached the object that it had better not be picked up. We will meet several such quick Johnny calculations in this book, some of them stretching toward matters that, in one of his favorite phrases, could "potentially jiggle the planet."

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If Johnny had lived a normal scholar's life span, to just about now, would he have brought further big changes in the way we live? This is a fair question for a biographer, and my honest answer is, I would guess so. The ways in which he would have changed it depend on what ideas others would have brought to him, and on how many multitudes of five blocks he would then have jumped ahead of them. But some guesses can be made from his sometimes-unpublished jottings in his last years.

Johnny himself expected that scientific progress in 1957–92 would be faster than it has been. Near his death he was groping toward possibilities around which other scientists' imaginations have not yet begun to furl. These included his approach (or what he called his "somewhat systematized set of speculations on how an approach ought to be made") to the lessons to be learned from the human nervous system for his computers. He felt the whole concept of numbers had to be reoriented for the computer age, and feared it had not been.