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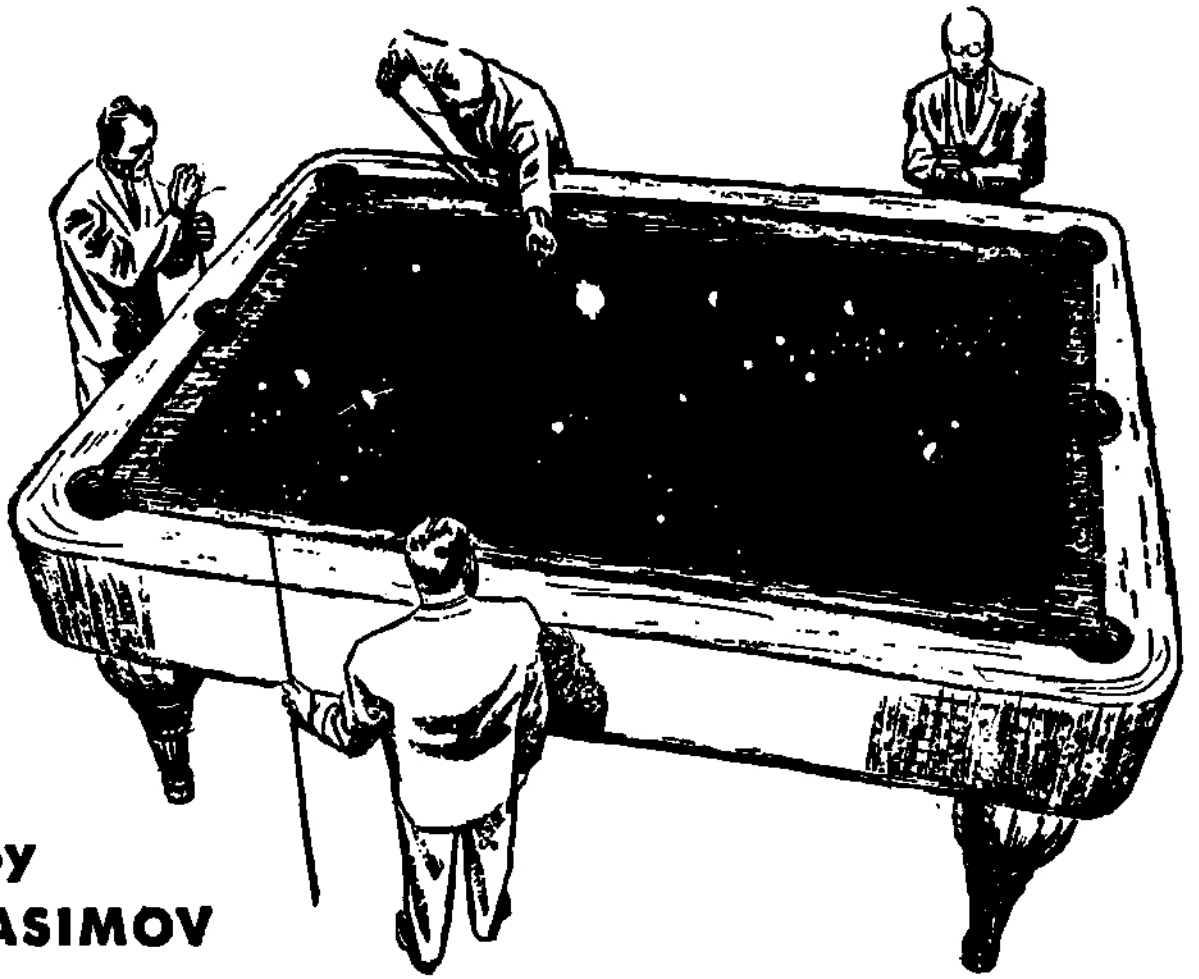
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By  
**ISAAC ASIMOV**

## Darwinian Pool Room

**Creation's meaning is an awesome secret. Or maybe not.**

“OF COURSE the ordinary conception of Genesis I is all wrong,” I said. “Take a pool room, for instance.”

The other three mentally took a pool room. We were sitting in broken down swivel-chairs in Dr. Trotter's laboratory, but it was no trick at all for them to convert the lab benches into pool tables, the tall ring-stands into cues, the reagent bottles into billiard balls and then wait for me to do something with the imaginary layout.

Thetier even raised one finger,

closed his eyes and muttered softly. “Pool room!” Trotter, as usual, said nothing at all, but nursed his second cup of coffee. The coffee, also as usual, was horrible, but then I was the newcomer to the group and had not yet calloused my gastric lining.

“Now consider the end of a game of pocket pool,” I said. “You've got each ball, except the cue-ball, of course, in a given pocket—”

“Wait a while,” said Thetier, always the purist. “It doesn't matter which pocket.”

“Beside the point. When the

game is over, the balls are in various pockets. Right? Now suppose you walk into the pool room when the game is all over, and observe only that final position and try to reconstruct the course of previous events. You have several alternatives.

"Not if you know the rules of the game," said Madend.

"Assume complete ignorance," I said. "You *can* decide that the balls were pocketed by being struck with the cue-ball, which in turn was struck by the cue. This would be the truth, but not an explanation that is very likely to occur to you spontaneously. It is much more likely that you would decide that the balls were individually placed in their corresponding pockets by hand, or always existed in the pockets as you found them."

"All right," said Thetier, "if you're going to skip back to Genesis, you will claim that by analogy we can account for the universe as either having always existed, having been created arbitrarily as it is now, or having developed through evolution. So what?"

"That's not the alternative I'm proposing at all," I said. "Let us accept the idea of creation for a purpose, and consider only the methods by which such a creation could have been accomplished. It's easy to suppose that God said, 'Let there be light,' and there was light, but it's not esthetic."

"It's simple," said Madend, "and 'Occam's Razor' demands that of

alternate possibilities, the simpler be chosen."

"Then why don't you play pool by putting the balls in the pockets by hand? That's simpler, too, but it isn't the game. Now if you started with the primordial atom—"

"What is that?" asked Trotter craftily.

"Well, call it all the mass-energy of the universe compressed into a single sphere, in a state of minimum entropy—completely at rest, motionless. Now explode that in such a way that all the constituent particles of matter and quanta of energy act, react and interact in a pre-calculated way, so that just our present universe is created. Wouldn't that be much more satisfactory than simply waving your hand and saying, 'Let there be light'?"

"YOU mean," said Madend, "like stroking the cue-ball against one of the billiard-balls and sending all fifteen into their predestined pockets?"

"In an esthetic pattern," I said.

"There's more poetry in the thought of a huge act of direct will," said Madend.

"That depends on whether you look at the matter as a mathematician or a theologian," I said. "As a matter of fact, Genesis I could be made to fit the billiard-ball scheme. The Creator could have spent His time calculating all the necessary variables and relationships into six gigantic equations. Count one 'day'

for each equation. After having applied the initial explosive impetus, He would then 'rest' on the seventh 'day', said seventh 'day' being the entire interval of time from that beginning to 4,004 B.C. That interval, in which the infinitely complex pattern of billiard balls is sorting itself out, is obviously of no interest to the writers of the Bible. All two billion years of it could be considered merely the developing single act of creation."

"You're postulating a teleological universe," said Trotter, "one in which purpose is implied."

"Sure," I said. "Why not? A conscious act of creation without a purpose is ridiculous. Besides which, if you try to consider the course of evolution as the blind outcome of non-purposive forces, you end up with some very puzzling problems."

"**A**S FOR instance?" asked Madend.

"As for instance," I said, "the passing away of the dinosaurs."

"What's so hard to understand about that?"

"There's no logical reason for it. Try to name some."

"Law of diminishing returns," said Madend. "The brontosaurus got so massive, it took legs like tree-trunks to support him, and at that he had to stand in water and let buoyancy do most of the work. And he had to eat all the time to keep himself supplied with calories. I mean *all the time*. As for the carni-

vores, they afflicted such armor upon themselves in their race against one another, offensive and defensive, that they were just crawling tanks, puffing under tons of bone and scale. It got to the point where it just didn't pay off."

"Okay," I said, "so the big babies die off. But most of the dinosaurs were *little* running creatures whose mass and armor had not become excessive. What happened to them?"

"As far as the small ones are concerned," put in Thetier, "there's the question of competition. If some of the reptiles developed hair and warm blood, they could adapt themselves to variations in climate more efficiently. They wouldn't have to stay out of direct sunlight. They would not get sluggish as soon as the temperature dropped below eighty Fahrenheit. They would develop intelligence of a sort. Therefore, they would win the race for food."

"That doesn't satisfy me," I said. "In the first place, I don't think the various saurians were quite such pushovers. They held out for some three hundred million years, you know, which is 299 million more than genus *Homo*. Secondly, cold-blooded animals still survive, notably insects and amphibia—"

"High rate of reproduction," said Thetier.

"*And* plenty of reptiles. The snakes, lizards, and turtles are still very much in business. For that matter, what about the ocean? The saurians adapted to that in the shape of

ichthyosaurs and plesiosaurs. They vanished, too, and there were no newly developed forms of life based on radical evolutionary advances to compete with them. As near as I can make out, the highest form of ocean life are the fish—mammals aside—and they came before the ichthyosaurs. How do you account for that? The fish are just as cold-blooded and even more primitive. And in the ocean, there's no question of mass and diminishing returns since the water does all the work of support. The sulfur-bottom whale is larger than any dinosaur that ever lived. Another thing. What's the use of talking about the inefficiency of cold blood and saying that, at temperatures below 80, cold-blooded animals become sluggish? Fish are very happy at continuous temperatures of about 35, and there is nothing sluggish about a shark."

"**T**HEN why did the dinosaurs quietly steal off the Earth, leaving their bones behind?" asked Madend.

"They were part of the plan. Once they had served their purpose, they were gotten rid of."

"How? In a properly arranged Velikovskian catastrophe? A striking comet? The finger of God?"

"No, of course not. They died out naturally and of necessity according to the original pre-calculation."

"Then we ought to be able to find out what that natural, necessary cause of extinction was."

"Not necessarily. It might have been some obscure failure of the saurian biochemistry, deliberately provided for, some developing vitamin deficiency—"

"It's too complicated," said Thetier.

"It just seems complicated," I maintained. "Supposing it were necessary to pocket a given billiard-ball by making a four-cushion shot. Would you quibble at the complicated course of the cue-ball? A direct hit would be less complicated, but would accomplish nothing. And despite the apparent complication, the stroke would be no more difficult to the master. It would still be a single motion of the cue, merely in a different direction. The ordinary properties of elastic materials and the laws of conservation of momentum would then take over."

"I take it then," said Trotter, "that you suggest that the course of evolution represents the simplest way in which one could have progressed from original chaos to man."

"That's right. Not a sparrow falls without a purpose, and not a pterodactyl, either."

"And where do we go from here?"

"Nowhere. Evolution is finished with the development of man. The old rules don't apply any more."

"Oh, don't they?" said Madend. "You rule out the continuing occurrence of environmental variation and of mutations?"

"In a sense, I do," I insisted.

"More and more, man is controlling his environment, and more and more he is understanding the mechanism of mutations. Before man appeared on the scene, creatures could neither foresee and guard themselves against shifts in climatic conditions, nor could they understand the increasing danger from newly developing species before the danger had become overwhelming. But now ask yourself this question: What species of organism can possibly replace us and how is it going to accomplish the task?"

"We can start off," said Madend, "by considering the insects. I think they're doing the job already."

"THEY haven't prevented us from increasing in population about ten-fold in the last two hundred and fifty years. If man were ever to concentrate on the struggle with the insects, instead of spending most of his spare effort on other types of fighting, said insects would not last long. We could clean them off the planet."

"What about bacteria, or, better still, viruses?" asked Madend. "The influenza virus of 1918 did a respectable job of getting rid of a sizable percentage of us."

"Sure," I said, "just about one per cent. Even the Black Death of the 14th Century only managed to kill one-third of the population of Europe, and that at a time when medical science was non-existent. It was allowed to run its course at

will, under the most appalling conditions of medieval poverty, filth and squalor, and still two-thirds of our very tough species managed to survive. Disease can't do it."

"What about man himself developing into a sort of superman and displacing the old-timers?" suggested Thetier.

"Not likely," I said. "The only part of the human being which is worth anything, as far as being boss of the world is concerned, is his nervous system; the cerebral hemispheres of the brain, in particular. They are the most specialized part of his organism and therefore a dead end. If there is anything the course of evolution demonstrates, it is that, once a certain degree of

specialization sets in, flexibility is lost. Further development can proceed only in greater specialization."

"Isn't that exactly what's wanted?" said Thetier.

"Maybe it is, but as Madend pointed out, specializations have a way of reaching a point of diminishing returns. It's the size of the human head at birth that makes the process difficult and painful. It's the complexity of the human mentality that makes mental and emotional maturity lag so far behind sexual maturity in man, with *its* consequent harvest of troubles. It's the delicacy of mental equipment that makes most or all of the race neurotic. How much further can we go without complete disaster?"



“THE development,” said Mad-end, “might be in greater stability, or quicker maturity, rather than higher brain-power.”

“Maybe, but there are no signs of it. Cro-Magnon man existed ten thousand years ago, and there are indications that modern man is his inferior, if anything, in brain-power. And in physique, too.”

“Ten thousand years,” said Trotter, “isn’t much, evolutionarily speaking. Besides, there is always the possibility of other species of animals developing intelligence, or something better—and don’t say there couldn’t be anything better.”

“We’d never let them. That’s the point. It would take hundreds of thousands of years for, let us say, apes or insects to become intelligent,

and we’d wipe them out—or else use them as slaves.”

“All right,” said Thetier. “What about obscure biochemical deficiencies, such as you insisted on in the case of the dinosaurs? Take Vitamin C, for instance. The only organisms that can’t make their own are guinea-pigs and primates, *including man*. Suppose this trend continues and we become impossibly dependent on too many essential food factors. Or what if the apparent increase in the susceptibility of man to cancer continues?” Then what will happen?”

“That’s no problem,” I said. “It’s the essence of the new situation, that we are producing all known food-factors artificially, and may eventually have a completely synthetic diet.

And there's no reason to think we won't learn how to prevent or cure cancer some day."

Trotter got up. He had finished his coffee, but was still nursing his cup. "All right, then, you say we've hit a dead end. But what if all this has been taken into the original account? The Creator was prepared to spend three hundred million years letting the dinosaurs develop something or other that would eventually result in mankind—or so you say. Why can't He have figured out a way in which man could use his intelligence and his control of the environment to prepare the next stage of the game? That might be a very tricky part of the pool game."

That stopped me. "How do you mean?"

Trotter smiled at me. "Oh, I was just thinking that it might not be entirely coincidence, and that a new race may be coming and an old one going, entirely through the efforts of this cerebral mechanism." He tapped his temple.

"In what way?"

"Stop me if I'm wrong, but aren't the sciences of nucleonics and cybernetics reaching simultaneous peaks? Aren't we inventing hydrogen bombs and thinking machines *at the same time*? Is that coincidence—or part of the divine purpose?"

That was about all for that lunch hour. It had begun as logic-chopping just to kill time, but since then—I've been wondering.

—ISAAC ASIMOV