

COLLIDING CONTINENTS

EARTH

By Marcia F. Bartusiak

The time is 50 million years from now. For millennia Australia has drifted northward at the astounding "speed" of three inches a year to end up nestled against Southeast Asia. That 3,000-mile trip from the southern reaches of the Pacific Ocean into warmer equatorial waters has turned the bleak, dry interior of the giant island continent into a tropical paradise. Kangaroos and koala bears (or whatever new fauna they have evolved into) can finally venture into a new continental neighborhood, ending a geographical isolation that has lasted millions of years.

The very idea that continents like Australia might move about the globe was considered ludicrous as late as the 1950s. But today, because of the work of dozens of geologists such as Alfred Ziegler and Christopher Scotese, of the University of Chicago, the theory of a mobile terra firma has been accepted as fact. By studying the dozen or so plates forming the earth's outer crust, Ziegler and Scotese have traced the movement of the continents as far back as half a billion years. And now with the help of a computer they have reversed the arrow of time: By analyzing present-day plate movements, the Chicago group has managed to project the earth's wrenchings, tearings, and crunchings into the future.

According to Ziegler, future geography will be forged by the same geological rules that have shaped the earth for eons: Propelled by the turbulent motion of the earth's scorching inner core, some plates will collide, thrusting mountain ranges upward, opening trenches wide, and rumbling the plains. Other plates will move apart, spewing molten material to form volcanoes and new seafloors. And, although scientists don't yet understand exactly why, immense continental slabs like Australia will continue to raft inexorably north, as they have done for billions of years.

Southwest California, for instance, is tearing loose from the mainland along the infamous San Andreas Fault and traveling northward on the Pacific plate

at about four inches a year. Within 10 million years, Angelenos will be able to pick up the hearts they left in San Francisco as their city glides right by the Bay Area. In another 50 million years that nomadic piece of California will probably plaster itself onto Alaska.

Africa is also going with the flow as it inches northward toward Europe. After the two continents clash, some 50 million years hence, the Mediterranean Sea may disappear, and in its place may rise a string of mountains to rival some of the highest in the world. In fact, with the Australian plate slamming into Asia at just the same time, it's not unlikely that a Himalayan-type chain will run halfway around the globe—starting at Spain and stretching eastward for thousands of miles to the South China Sea.

With Australia bumping into Asia, and Africa colliding with Europe, it's inevitable that other immense slabs will be moving apart, giving molten magma from deep within the earth the chance to rise and form a huge ocean floor. The Red Sea is such an ocean in the making: Indeed,

if the Saudi Arabian peninsula continues moving away from Africa at the same rate as today, the embryonic Red Sea could be as wide as the Atlantic Ocean in about 200 million years.

No matter what the change, Ziegler notes, geographical refurbishing is going to play havoc with present-day climatic patterns. And with each shift in weather, local flora and fauna will either die out, mutate, or adapt. As Africa moves northward, the Sahara will probably bloom, while the thick Congo jungle in the very heart of the continent withers away. On the other side of the world, northwest Canada might sprout oranges and palms as the North American plate rotates left.

But ultimately the dance of the continents will end. The earth's interior engine—its molten core—will cool. And, like a rundown carousel, plate movement will first become sluggish and then, in a few billion years, stop altogether. "It's going to be a sad time for Earth," says Scotese. Without the power to keep peaks uplifted, the mountains will easily erode. Relentless rains and whirling winds will soon flatten the entire surface of the earth. "Erosional processes would probably get the Himalayas down to Appalachian size in just thirty million to forty million years," Scotese says, a mere blink in geologic time.

In such a world, evolution will lose its impetus, Scotese explains. "The movements of the plates are always throwing down the evolutionary gauntlet, so to speak, to plants and animals. 'Here's a new mountain range you have to get through,' it says. Or, 'We're going to rip this continent in half; so you'll have to evolve into two different species now.' Once the continents stop moving, there will be no such challenge."

According to one scenario, the continents may die out completely. Not the meek, but the aquatic, will inherit the earth as one shallow sea eventually covers the flattened terrain, with only a few islands dotting the monotonous seascape where the highest mountains had been located. As Scotese remarks, "I guess only the fish will like it a lot." ☐



A shallow sea may one day cover the earth.