

each other, though our bodies are still chained to our planets.

I am glad that we have met, Tyson thought. Our peoples can be friends.

Yes, answered the alien, friends. Friends against the unknown.

Perhaps, thought Tyson, feeling a strange new emotion that was both fear and hope, perhaps our peoples will meet someday, when we both go to the stars. Perhaps someday we will stand on the ground of each other's planets.

Perhaps, replied the alien. Perhaps, if we live in the same universe. Then, somehow sadly, filled with loss, But how can we ever know?

The Places! Tyson thought. Our peoples have passed each other before in the Places, like fearful animals in the dark. But now there need be no more fear. We will meet again . . . in the Places, whether they are real or not. The Places will be our meeting ground, until someday, perhaps, our ships meet each other in our own universe. . . .

Yes, thought the stranger, no longer quite an alien, in the Places. In the Places where we are both aliens, we will have a meeting ground. We will meet again.

Perhaps, together, some day, we will learn what the Places really are, Tyson thought.

Yes, thought the stranger, his mind seeming to grow faint and dim in Tyson's, yes, together. It is a good thought. This Place is fading now. The drug is wearing off. I am returning to my own world. Goodby . . . goodby . . . goodby till we meet again . . . in the Places . . . goodby . . . goodby. . . .

Goodby, Tyson thought. Goodby, fellow Voyager.

The stranger was gone. Once more, Tyson was alone in the Place, waiting for the Psychion-36 to wear off, waiting to return to an Earth that would no longer be quite the same.

He was alone, but not in the same sense as he had been before. Somewhere, sometime, in some universe, there were other intelligent beings, beings that could be as much friends as aliens.

In this Place, in this enigmatic reality that might or might not be real, two races had contacted each other for the first time, a contact so tenuous, so tentative, that all each had learned was that the other existed. It was not very much. But it was a beginning.

[Cairo, Egypt. It is on the Nile and has a population of 3,346,000. (See Science.)]

SCIENCE



OLD MAN RIVER

by Isaac Asimov

A COUPLE OF WEEKS AGO (AS I WRITE), I HAD A LUNCHEON DATE with an editor in order to discuss a possible new book, and we decided to meet at a restaurant at 12:15 P.M. The editor, I might say, was a young lady, for that is not irrelevant to the story.

I must admit, now, that I have a fault that is also not irrelevant to the story. Although nearly perfect in almost every other respect, I do have a tendency to be early to appointments. This means I frequently have to wait, something to which I am completely hardened, and which doesn't bother me. However, when the other party arrives (usually late) there seems to be something about my frank and friendly countenance that indicates I have been waiting a long time and this produces flustered explanations which I dismiss genially.

In this case, I arrived at 12:10 and was shown to a seat. The young lady in question arrived at 12:17 and bore down upon me, explaining as she came.

Naturally, I couldn't allow this. In the first place she was only two minutes late; in the second place, I had only been waiting seven minutes, hardly anything compared to what I am accustomed to; and in the third place, she was a young lady.

So I rose as she reached the table and said in my normal speaking voice (which has a tendency to rattle the distant windows), "Not at all, darling! I've been spending a delightful few minutes here, dreaming of you, and anticipating the ecstasy of your approaching presence!"

—You know, just the usual sort of thing writers are always saying to editors.

A passing waiter stopped in his tracks as I said this, rather as if he had been pole-axed. He turned toward me and stared in growing un-

certainly at my sunny blue eyes and my high Slavic cheekbones. Finally, he said (with a distinct Italian accent), "Pardon me, sir, but can you possibly be Italian?"

What could I do? Could I hurt his supreme faith in the gallantry of the Italian male? So I said, "Yes, indeed—but only with the ladies."

And he left, thoroughly content.

But it made me think of the manner in which I always try to evade the stereotype. This goes (knock wood) for my writing as well, which gives no clear indication as to what I "specialize" in. My most recent book, for instance, is entitled *THE ROMAN REPUBLIC* and it is a straight history book.

Naturally, I am sure to be asked, "But what do you know about history?"

To which I intend to answer, with a gentle smile, "As little as I know about science."

That should not only content the questioners but give them the (mis-taken) notion that I have just exhibited a charming modesty.

Of course, one of the reasons I have been able to avoid being pigeon-holed as a this or a that* is this particular series of monthly articles. Since I am given carte blanche as far as subject matter is concerned, I can experiment, and pamper my interests in whatever direction.

For instance, I have written a number of quasi-geographic articles recently and since I now want to write another one, I intend to do so.

What sparked the immediate interest was my receipt of a new atlas, *THE ODYSSEY WORLD ATLAS* published by Odyssey Books. It is large, spectacular, and crowded with information, and while I was turning the pages with intense pleasure, I came across a list of rivers. It struck me at once (as it has struck me often before) that the longest river in North America has no name.

The river in question was "discovered" by the Spanish explorer, Hernando De Soto in 1541. I put "discovered" in quotation marks because to neglect them would be an exercise in racism. De Soto was the first *European* to see the river, but non-Europeans had discovered it many thousands of years before. It's like the controversy of who *really* discovered America, Christopher Columbus, Lief Ericsson, or St. Brendan—when all along the real discoverer was some nameless Indian.

The Indians who lived on the river banks at the spot reached by De Soto, called it "Big River" with admirable straightforwardness. Of

*When the question is put to me bluntly, I answer, "Well, in theory, I'm a bio-chemist."

course, they called it that in their own language so that it was "Miti Sepe" or something like that. And this became, to Americans and to the world, "Mississippi."

The Mississippi River was taken to be the stream that flowed from Lake Itasca in northern Minnesota, in a generally southward direction, down to the Gulf of Mexico, a length of 2,350 miles. In 1783, the western boundary of the United States was established along almost the entire length of this river (the final hundred miles at the mouth remained in the hands of, first Spain, and then France, for twenty years more). The name, as applied to that particular stretch of flowing water was therefore frozen into American consciousness past all eradication.

Just a few miles north of the city of St. Louis, another river flows into the Mississippi. There is a three mile stretch of the Mississippi, right in that neighborhood, that runs due north and south with scarcely a wiggle, and the other river comes straight into it from the west at nearly a right angle. This incoming river is called the Missouri River from the name given themselves by an Indian tribe that lived on its banks.

Now, psychologically, one pictures a river as moving straight ahead with a tributary coming in at right angles. Consequently, it seemed only natural to think of the Missouri as a tributary of the Mississippi. This was especially so since the Mississippi was a long, long river, known from source to mouth, whereas the Missouri trickled off into the western wilderness somewhere and, for all anyone knew, might conceivably be only a few hundred miles long.

In 1803, however, the United States bought the Louisiana Territory from France (which had no legal right to sell, but its too late now). Since the Territory included, in theory, the entire drainage area of the western tributaries of the Mississippi, there was importance in determining just where those tributaries went.

In an exploring expedition lasting from 1804 to 1806, Meriwether Lewis and William Clark traced the Missouri River back to its source in what is now southwestern Montana. As it turns out, the Missouri River, following it backward through its longest tributaries, is 2,466 miles in length, which makes it a trifle longer than the Mississippi.

But let us now go back to the confluence of the Mississippi and the Missouri just north of St. Louis. When two rivers come together, which is the river and which the tributary? If we want to be logical, we ought to say that the longer of the two joining streams is the river and the shorter is the tributary.

In that case, we have at St. Louis, first, the Missouri, which is 2,466

miles long and second, the length of the Mississippi above St. Louis (the Upper Mississippi River) which is only 1,050 miles long. Clearly the Missouri is the river and the Upper Mississippi the tributary.

Imagine a drop of water trickling down the northern slopes of the mountain ridge making up the boundary between the states of Montana and Idaho. It joins something called the Red Rock Creek, which eventually becomes the Missouri River. It is carried through Montana and the Dakotas, along the boundaries between Nebraska and Iowa, into the state of Missouri, joins what we call the Mississippi at St. Louis, flows southward past Memphis, Vicksburg, and New Orleans into the Gulf of Mexico.

From the Montana mountains to the sea, that drop of water has travelled 3,760 miles along a single unbroken river, and what is the name of that single unbroken river? It has none! Part of it is called the Missouri and part of it the Mississippi, but the whole of it has no single name. The best we can do is call it the Missouri-Mississippi which is clumsy and sounds artificial.

The Missouri-Mississippi, though the longest river in North America and the "Old Man River" of the song, is not the longest river in the world. There are two rivers that are longer.

In fact, let's make a table of the "Great Rivers" of the world, using as our criterion for greatness the thoroughly artificial one of a length of a thousand miles or more. Naturally, the figures on length are only approximate in some cases, but here goes:

<i>Great River</i>	<i>Continent</i>	<i>Outflow</i>	<i>Length (miles)</i>
Nile	Africa	Mediterranean Sea	4,160
Amazon	South America	Atlantic Ocean	3,900
Missouri-Mississippi	North America	Gulf of Mexico	3,760
Ch'ang (Yangtze)	Asia	East China Sea	3,370
Hwang-Ho	Asia	Yellow Sea	2,870
Congo	Africa	Atlantic Ocean	2,720
Amur	Asia	Sea of Okhotsk	2,700
Lena	Asia	Arctic Ocean	2,660
Peace-Mackenzie	North America	Arctic Ocean	2,640
Mekong	Asia	South China Sea	2,600
Niger	Africa	Gulf of Guinea	2,600
Parana	South America	Rio de la Plata	2,580
Ob	Asia	Arctic Ocean	2,500

<i>Great River</i>	<i>Continent</i>	<i>Outflow</i>	<i>Length (miles)</i>
Yenesei	Asia	Arctic Ocean	2,410
Murray	Australia	Great Australian Bight	2,310
Volga	Europe	Caspian Sea	2,290
Madeira	South America	Amazon River	2,100
Yukon	North America	Bering Sea	2,000
Purus	South America	Amazon River	1,950
St. Lawrence	North America	Gulf of St. Lawrence	1,900
Rio Grande	North America	Gulf of Mexico	1,890
Irtysk	Asia	Ob River	1,840
Syr Darya	Asia	Lake Aral	1,810
Brahmaputra	Asia	Bay of Bengal	1,800
Indus	Asia	Arabian Sea	1,800
Sao Francisco	South America	Atlantic Ocean	1,800
Danube	Europe	Black Sea	1,750
Japura	South America	Amazon River	1,750
Darling	Australia	Murray River	1,725
Euphrates	Asia	Persian Gulf	1,710
Tocantins	South America	Amazon River	1,670
Zambezi	Africa	Mozambique Channel	1,630
Saskatchewan-Nelson	North America	Hudson Bay	1,600
Orinoco	South America	Atlantic Ocean	1,600
Salween	Asia	Andaman Sea	1,600
Ural	Asia-Europe	Caspian Sea	1,570
Amu Darya	Asia	Lake Aral	1,550
Ganges	Asia	Brahmaputra River	1,530
Paraguay	South America	Parana River	1,530
Arkansas	North America	Missouri-Mississippi R.	1,450
Colorado	North America	Gulf of California	1,450
Dnieper	Europe	Black Sea	1,420
Negro	South America	Amazon River	1,400
Si-Kiang	Asia	South China Sea	1,380
Angara	Asia	Yenesei River	1,300
Allegheny-Ohio	North America	Missouri-Mississippi R.	1,300
Irrawaddy	Asia	Andaman Sea	1,300
Orange	Africa	Atlantic Ocean	1,300
Pilcomayo	South America	Paraguay River	1,300
Columbia	North America	Pacific Ocean	1,210
Don	Europe	Sea of Azov	1,210
Sungari	Asia	Amur River	1,170

Great River	Continent	Outflow	Length (miles)
Tigris	Asia	Persian Gulf	1,160
Upper Mississippi	North America	Missouri-Mississippi R.	1,050
Snake	North America	Columbia River	1,040
Red	North America	Missouri-Mississippi R.	1,020
Churchill	North America	Hudson Bay	1,000
Uruguay	South America	Rio de la Plata	1,000

There are thus 58 Great Rivers on the Earth, which may be divided up among the continents as follows:

Asia	21
North America	14
South America	12
Africa	5
Europe	5
Australia	2

The total here comes to 59 because the Ural River forms the entirely artificial boundary between Europe and Asia and is counted to both.

We might say that among the Great Rivers are four "Super-rivers" with lengths of more than 3000 miles, distributed, nearly enough, one to a continent. Africa boasts the Nile, South America the Amazon, North America the Missouri-Mississippi, and Asia the Chang (better known to me, at least, as the Yangtze).

And yet this is an illusion. Judging by every criterion *but* length, there is only one Super-river. Suppose, for instance, that we consider the area of land drained by a river and its tributaries. The Chang (Yangtze) drains something less than a million square miles, while the Nile and the Missouri-Mississippi drain something more than a million. None of the three are in first place. None of them are even in second place.

Judging by the size of the drainage area, the Congo River, which is only in sixth place in length, and is distinctly below the 3,000 mile mark, does much better than the stretched-out Nile. It has a drainage area of 1,600,000 square miles.

And at that, the Congo is only in second place. Surpassing it easily is the Amazon which, with its tributaries, drains about 2,700,000

square miles. The discrepancy becomes even greater if we compare drainage areas to the total continental area. After all, a South American river has less potential area to drain than an Asian river has, simply because South America is the smaller continent. If we do this, the results look as follows:

River	Continent	Fraction of Continent Drained
Ch'ang (Yangtze)	Asia	0.05
Nile	Africa	0.09
Missouri-Mississippi	North America	0.13
Congo	Africa	0.14
Amazon	South America	0.40

In this respect, the Amazon is incomparable.

We can conclude precisely the same thing if we consider the volume of water delivered by the rivers. The Nile, despite its great length, flows through the desert for a thousand miles and loses much water by evaporation. It delivers a comparatively small volume to the sea, therefore. The Missouri-Mississippi and its tributaries discharge 675,000 cubic feet of water per second into the ocean. The Chang (Yangtze) does rather better with a mark of 770,000 and the Congo does still better with 1,200,000 cubic feet per second. However, the Congo is only second best. I cannot find the precise figures for the Amazon River in my library, alas, but I remember reading once that its volume of discharge was seven times that of the second most voluminous river, which would make it some 8,000,000 cubic feet per second.

Let's see if we can't do something for the Amazon River in terms of length as well.

The Great Rivers, if we look at the table, fall into two classes. There are, first, main rivers that flow into oceans, gulfs, bays or inland seas. Then there are tributaries that flow into larger rivers. Among the Great Rivers are seventeen tributaries that are themselves Great Rivers. Let's pull them out of the list and look at them:

Tributary	River
Madeira	Amazon
Purus	Amazon
Irysh	Ob
Japura	Amazon

Darling	Murray
Tocantins	Amazon
Ganges	Brahmaputra
Paraguay	Parana
Arkansas	Missouri-Mississippi
Negro	Amazon
Angara	Yenesei
Allegheny-Ohio	Missouri-Mississippi
Pilcomayo	Paraguay
Sungari	Amur
Upper Mississippi	Missouri-Mississippi
Snake	Columbia
Red	Missouri-Mississippi

As you see, the Amazon has five tributaries that are themselves Great Rivers. In fact, of the six longest tributaries in the world, no less than four are tributaries of the Amazon. This includes the longest tributary of all, the Madeira River—the only river in the world that manages to be longer than 2,000 miles and then end up merely in another river.

No other Great River can match this. The Missouri-Mississippi has four Great River tributaries, but they are from the short half of the list whereas the Amazon's are from the long half. The Parana has two such tributaries, but those two form a unique combination. It has a Great River tributary and a Great River *sub*-tributary. The Pilcomayo flows into the Paraguay which, in turn, flows into the Parana, and all three are Great Rivers. There is no other case like that on Earth. Six other Great Rivers: Ob, Murray, Brahmaputra, Yenesei, Amur and Columbia, have one Great-River tributary apiece.

Suppose now that we add up lengths. Let us add to the length of each Great River, the length of each Great-River tributary and call the total length that of the "Great-River System." It turns out there are eight such Great-River Systems over 3,000 miles in length, and there are also two Great Rivers which have no Great-River tributaries but which are themselves over 3,000 miles long. Let's add them in and list the ten of them:

Great-River Systems	Total Length (miles)
Amazon	12,770
Missouri-Mississippi	8,580
Parana	5,310
Ob	4,340

Nile	4,160
Murray	4,035
Amur	3,870
Yenesei	3,710
Ch'ang (Yangtze)	3,370
Brahmaputra	3,350

Of these ten Systems, five are in Asia, two are in South America, and one each is in North America, Africa, and Australia. The three largest, oddly enough, are in the Western Hemisphere.

But as you can see the Amazon Great-River System is far longer than any other, so that length joins volume of flow and drainage area to mark out the uniqueness of that river.

The Amazon River is *the* Old Man River; no other stream need apply. There is sober truth in saying that all the rivers in the world fall into two classes. The first includes the Amazon River. The second includes all the rest.

Now, for another point. Consider the fate of the Great Rivers; their point of outflow.

In the table of the Great Rivers, I gave the outflow as seas, gulfs, bays and so on. Actually, we can be more fundamental. Each river that reaches the open sea, either directly, or by way of the larger river into which it flows, ends up in one of the three great divisions of the ocean (see WATER, WATER, EVERYWHERE . . . F & SF, December 1965). These are the Pacific Ocean, the Atlantic Ocean (including the Arctic Ocean) and the Indian Ocean.

If we look at it that way then the five longest Great-River Systems all flow into the Atlantic Ocean. (The longest that does not is the Murray-Darling in Australia and that, while long, is a mere trickle of a river that doesn't amount to much.)

Suppose, then, we become systematic and go back over our list of Great Rivers, counting how many of them flow into each ocean, and finding the total mileage in each case.

Ocean	Great Rivers	Total Length (miles)
Atlantic	34	66,060
Pacific	10	19,790
Indian	10	16,585

There is no question but that the Atlantic Ocean receives most of the river water in the world. Not only does it receive more Great Rivers

with a longer total mileage than the other two oceans combined but among the rivers flowing into the Atlantic are the very largest—the Amazon and the Congo.

Notice, by the way, that there are 54 Great Rivers that drain off into the three oceans, whereas there are 58 Great Rivers altogether. There is no mystery here; the discrepancy has a simple explanation. There are four Great Rivers that never reach the ocean. Here they are:

<i>Great River</i>	<i>Outflow</i>
Volga	Caspian Sea
Syr Darya	Lake Aral
Ural	Caspian Sea
Amu Darya	Lake Aral

The Caspian Sea and Lake Aral are both inland seas and each receives two Great Rivers; the only inland bodies of water to do so. The Volga River thus has the distinction of being not only the longest river in Europe but also the longest river anywhere in the world that never reaches the ocean.

As it happens 3½ of these four rivers are to be found entirely within the territory of the Soviet Union. The headwaters of the Amu Darya form part of the border between the Soviet Union and Afghanistan.

Interestingly enough, these Great Rivers are rather poor in large cities. Such cities tend to cluster on the shores of lakes or oceans. When they are on rivers, the rivers are very often small. London is on the Thames River (209 miles long); Paris on the Seine (480 miles); Berlin on the Spree (220 miles); and Moscow on the Moskva (315 miles).

Consider the American Great-River system, the Missouri-Mississippi. Not one of America's million-and-over cities is to be found upon it. We have five cities with a population of over a million, and of these, one is on the Atlantic Ocean, one on the Pacific Ocean, one on Lake Michigan, and one on Lake St. Clair. The fifth is on a river but not a Great River.

The largest city on all the thousands of miles of the Missouri-Mississippi system is St. Louis and its population is only 750,000.

Can you guess, then, which is the largest city in the world to be on a Great River in an inland location? (Close your eyes and try.) Now look at the answer on page 104 and see if you're right.

What with the established power of organized labor and the influence of various other protest movements, it may soon become difficult to isolate a reliable case of oppression. But there's always one Place where we can count on finding a vast army of downtrodden. Here, Brian Cleve spins a fanciful tale of unionization against the blackest Boss of all, with some uncertain, but extremely funny results. Mr. Cleve has written for British television, American magazines, and is the author of four novels. The latest, VICE ISN'T PRIVATE, will soon be published by Random House. He is a citizen of the Irish Republic. He lives in Dublin.

THE DEVIL AND DEMOCRACY

by Brian Cleve

"YOUR LOWNESS IS ALWAYS Left," said Belphagor, absent-mindedly taking the needle-sharp little soul of a TV producer out of his lapel and starting to pick his fangs. "But I think you ought to see them."

"I will not," snarled the Devil. "I've been master here since before the Creation. D'you think I'm going to let this crawling little worm of a fifth-class sinner come down here and unionise Hell? I will not see them. I will not deal with them. I will not recognise them.

And if that picket isn't off Hell's Gates inside ten minutes I'm going to—" and he lashed his tail so violently that he swept half a hun-

dred weight of Kitchen Cob Souls straight out of the soul scuttle into the fire. They sputtered damply and began to smoulder with a rather nasty smell.

"I asked you for Bright Household Nuts," said the Devil in a low, dangerous voice.

Belphagor shrugged.

"That's all there is. And when they're gone—" he shrugged again. "It's going to be extremely cold." He stuck the TV producer in the corner of his mouth in a rather vulgar manner and spread out his hands in front of the smoky mass of bankers, politicians and armchair generals. "If the electricians join in—" As he said