



INITIATIVES POUR L'AVENIR
DES GRANDS FLEUVES
INITIATIVES FOR THE FUTURE
OF GREAT RIVERS



THE PARANA RIVER





Who knows the Parana, the least
known of all the great rivers?

Here, when one speaks of shores, when one
dances to the sound of the “chamame”,
the music of the shore, the reference is not
to the sea but to the banks of the river.

The Parana



Tour Programme

- Buenos Aires
- Asunción
- Yacireta
- Itaipu
- Rosario
- Buenos Aires



It crosses three countries: Brazil, Paraguay and Argentina. It is swollen by tributaries flowing from Bolivia and Uruguay, so much so that its catchment area covers two million six hundred thousand square kilometres. The flow rate at its estuary frequently exceeds seventeen thousand cubic metres a second with peaks of sixty thousand!

This power has not escaped the attention of men. They have long attempted everything to harness it to their advantage. Thus sixty structures (dams and hydropower plants) have already been built.

I have appointments with the two largest.

The "smaller" of these two giants is Yaciretã. With commiseration I'm told that its installed capacity is greater than the combined capacity of the nineteen hydropowerplants operated by CNR on the Rhone.

So I'm off to Asunción for a forewarned humiliation.

What a beautiful country Paraguay is! It's said to be tiny, but it is nonetheless four fifths of the size of France. One has to quickly learn to adapt to the scale of things in South America. Long green and gently rolling expanses where herds

graze peacefully succeed each other. It's nothing like the meat factories of Brazil. The landscape is so peaceful and rural one must pinch oneself (or be informed) when told that behind these beautiful images ferocious conflicts are underway to control it. Land which is coveted even more as the income it generates is increasing. The big landowners refuse to sell anything, leading to deaths. Admittedly, the land registry is not only doubtful, it overflows with claims. The property deeds far outnumber the land to

which they give entitlement, so much so that a buyer of a property can develop it and, after two or three years, receive the visit of someone laying claim to the same property, deeds in hand. Recently, two German businessmen who



Yaciretá



had chosen to settle refused to give in. They were found dead. A contract killing costs only \$500. This legal instability somewhat slows down investments. The road continues indifferent to these tragicomedies. From time to time, a well spruced town or rather large village asks nothing better than to hold you back and teach

you a less frantic approach to life than your own: multi-coloured hammocks make up the majority of the local products.

Paraguari, Caapucu, San Juan Bautista, etc.

After travelling 300 kilometres we arrive at Yaciretá, in the south of this region

called Misiones, as it was where the Jesuits installed many of their colonies (the famous "reductions"). It is an island in the middle of the Parana which here separates Argentina from Paraguay. In Guarini, Yaciretá means "the place where the moon sleeps", and also the "place where the water is often turbulent".

Both countries have been interested in this site since the beginning of the 20th century. It was necessary to wait until 1973 before the old caciques, Juan Peron and the dictator Stroessner, signed a cooperation treaty. A binational company was founded to build a dam. Its mission was twofold: by regulating the flow rate, it would ensure navigation throughout the year by levelling the floods, and it would produce electricity. The works were to last twenty years and led to all kinds of anomalies, with the result that the dam was given the highly disputed title of "monument to corruption".

However, without wanting to excuse anything, the works were indeed titanic. A watertight dike 40 m high and 64 km long was built to create the reservoir (1,600 km²). The twenty turbines of the plant (808 long) were designed

to produce 20,000 GWh, with an installed capacity of 3,200 MW. Every precaution was taken as the water can rise suddenly. Two very large spillways can release together 90,000 m³ a second in case of floods, and a fish lift has not been omitted. There is also a lock capable of



The 20 Kaplan turbines in line

receiving boats and convoys in a chamber 270 metres long and 27 metres wide, with draught

of 3.66 metres. It has met its objectives every year and allows the passage of 3 million tons of products, mainly soya.

According to the official figures, it was necessary to displace only four thousand families and their new homes were much more comfortable than their previous dwellings, so they lost nothing in return. One thing is certain since visible: the environment in the immediate vicinity of the dam has been treated well. In particular, one branch of the river is constantly fed by one of the two spillways. A vast reserve of wetland is therefore preserved where animals thrive: birds, foxes, wild dogs, snakes (including the feared Jararacussus) and the no less dangerous crocodiles. Two towns stand opposite each other on the banks of the huge reservoir: Encarnacion in Paraguay, and Posadas in Argentina. They have profited from this windfall to develop beach tourism and nautical sports.

As for the electricity, the main goal of the operation, the wager has been won. Argentina receives 85% and Paraguay does not appear to take offence at receiving the rest.

And now we have to move on to the larger of the two giants, Itaipu, and head towards the old Ciudad Stroessner, renamed "del Este".

A scale model (1/100th) is presented first. Then the Manager of the International Centre of Hydro-information explains his role. This department of the binational company, Itaipu (Brazil/Paraguay), does not only content itself with gathering all the hydrological and climatic data, it is also responsible for the whole environment of the dam: the quality of the water up and downstream, relations with the communities, and the creation of reserves in which are preserved or reintroduced original fauna and flora. This manager constantly refers to his partnership with UNESCO while giving his explanations.



Itaipu



He wants to prove that in spite of its size, his dam is the friend of both nature and humans. With this lesson well-learned, it is now time to approach the monster.

To prepare you for the shock, your guide, a young woman all dressed in red, tells you that the works lasted seventeen years. Forty thousand workers supervised by seven thousand technicians worked 24 hours a day. As for the reservoir, just imagine: it covers 170 km²! Holding a volume of 29,000 million cubic metres, it is renewed in 28 days. Overwhelmed, we bend under the weight of these figures.

And here it is, the incredible grey wall closing a gorge of black basalt. There, below, we see the vivid green of the river. In Guarini the word Itaipu means "the stone that sings". The dam was built on rapids, there where eddies make the stones sing.

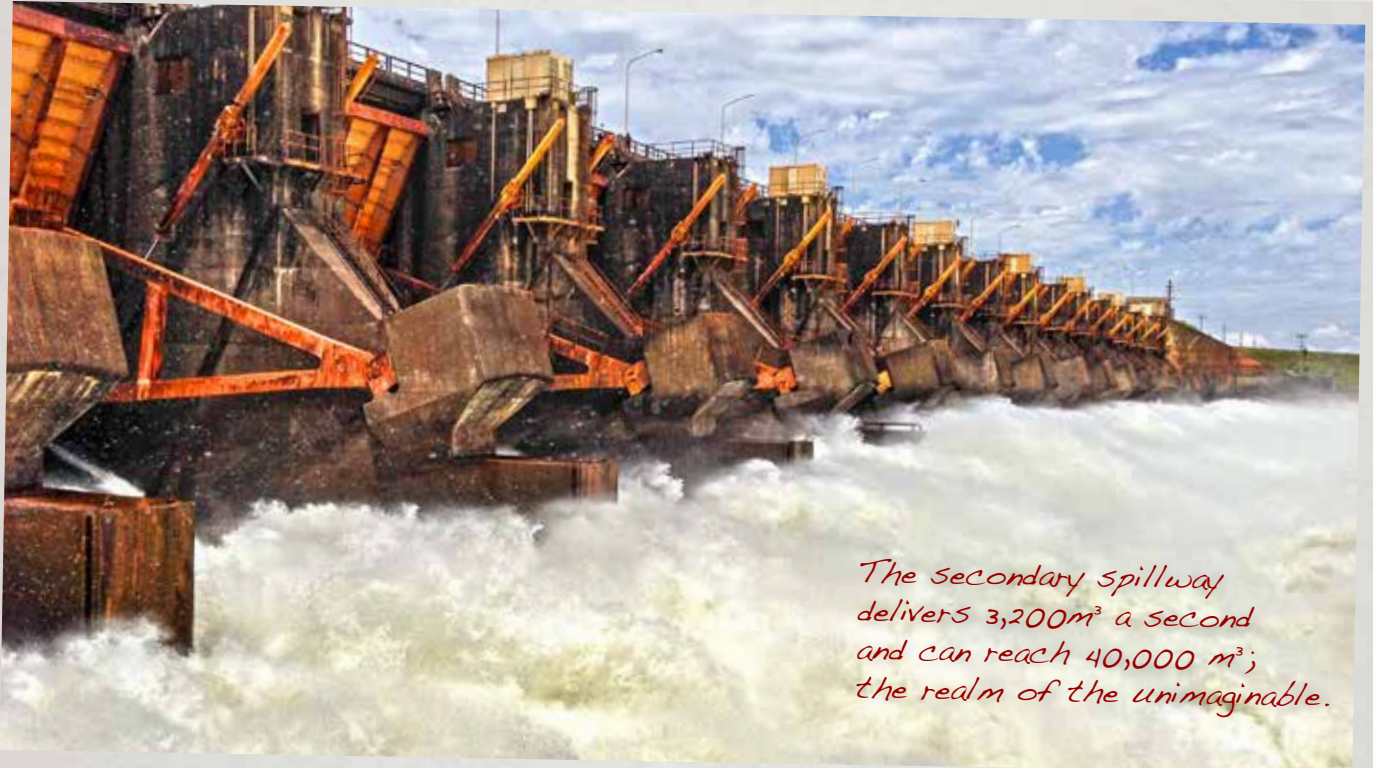
While the length of the previous giant awed me, what struck me with Itaipu was its mass and the concentration of its force. It looks like a fortress or an enormous huddled beast.

One raises one's head to assess the height : nearly two hundred metres. And the physical

presence of the thrust of the lake is manifest.

The ground vibrates under one's feet as twenty turbines, each weighing five hundred tons, rotate. You start to realise just where you've found yourself. You have been surrounded by the latest technologies, but suddenly you're transported into an archaic world, one of mythology or the workshop of an alchemist. Here you are at the heart of the largest transformation of water into electricity in the world. The installed capacity of 14,000 MW generated





*The secondary spillway
delivers $3,200\text{ m}^3$ a second
and can reach $40,000\text{ m}^3$;
the realm of the unimaginable.*

98,630,035 MWh in 2012, the world record.
Even though the Chinese have aimed higher,
they cannot control the Three Gorges Dam well
enough to produce more.

We return to the River Parana.

After a few eddies its flow has straightened and
will follow its descent until reaching the sea.
Who could imagine the tortures inflicted on it?

At this stage, resilience is indifference.

Block my course if you wish, but you cannot
stop me from continuing on my way.

Now, after this short account, don't you think
that the Parana, this spurned giant, deserves a
little attention?



Iguazu falls

Indeed, energy is not its only wealth.

The Parana gives the soil, animals and human beings all the water they could dream of. In spite of all these needs, the share taken is minute compared to its flow rate. No one protests at the 70% that goes to agriculture. There's always enough for other uses. It's a party for vegetation with all this water, sun and ambient heat. There are three soya harvests a year in Paraguay and two in Argentina!

There's no threat of water lacking here. It's the contrary, as flooding is much more dangerous.

The river overflows regularly and all the more easily since there are no banks. It's enough for the river to rise a few dozen centimetres for vast tracts of land to be flooded. The farms are devastated but it is above all the neighbouring districts where the poorest of the poor are

crammed together, as no one but them would want these marshes.

These disasters hit the entire basin.

To give an order of magnitude, the flow rates in 1982 exceeded sixty thousand cubic metres a second. The level of the water on land exceeded nine metres. In 2014, the Iguazu Falls almost disappeared. It should be borne in mind that certain "small" tributaries can swell suddenly, increasing from 500 cubic metres a second to 10,000 in less than six hours.



A binational control room ; one on the Paraguayan side, the other on the Brazilian side

Asunción was struck by a similar episode in 2014. A year later, 50,000 unfortunate victims still live in cesspools. In Santa Fe, just north of Rosario, where the flood struck severely, the French Front for the Global Environment carried out what was to be an exemplary mission.

Every river has a good side.

It transports all the loads entrusted to it without flagging, far more cheaply than trucks and with unrivalled respect for the environment.

Agriculture and livestock breeding has developed constantly thanks to the sun, the water of the river, and the almost complete disappearance of the forest. For example, Paraguay has become the world's fourth largest exporter of soya and the sixth largest for beef. What better route than this river to transport this wealth? It crosses all the areas of production from Bolivia and the Mato Grosso to the Atlantic.

But there are still the dams to cross, barriers by definition and function.

The engineers at Yacireta accepted to build a lock, but not those at Itaipu, obsessed by electricity. So the goods must be unloaded from the boats upstream of the dam. Trucks then take up the relay for thirty eight kilometres. Once the dam has been bypassed, the goods are reloaded onto other boats. Brazil and Argentina have decided to fill-in this blank. A large number of studies are in progress to choose the best layout

for the canal, which must cross a difference in level of 120 metres, making it necessary to build three locks each with a rise of forty metres. It will be enormously expensive, but the need



A push-tow convoy with 12 barges carrying \$100,000 worth of goods.

is there. It should not be forgotten that once navigable, the Parana will permit reaching Buenos Aires. The natural ports of the region of Sao Paulo (starting with Santos) are saturated.

The world of logistics is an ecosystem in which all resources must be linked together. The region was served by an extremely dense railway network up to the end of the 1980s but it was



swept away in a fever of deregulation, to the great joy of the trucking lobby and the great despair of the roads. The road network failed to receive the investments required since the

governments had chosen to lower taxes, making them penniless.

Another problem is the bed of the river downstream. The ochre colour of the water shows the quantity of sediment carried. Dredging is needed, but who will pay for it? In the meantime, only small barges (less than 1,500 tons) can sail beyond Rosario.

Let's not be naïve. The upper reaches of the Parana make it an ideal partner for all kinds of smuggling. How can the cargoes be checked and why risk one's life if you are a customs officer or policeman appearing too curious? Is it your fault if cocaine from Columbia and Peru, sent via Bolivia, is also being transported, well-hidden in the soya? Or cannabis? Insistent rumours have it that the lovely Paraguay has become South America's leading producer. It is also an agricultural product after all.

As for pollution, the authorities shrug away the different wastes, agricultural and urban, discharged into these torrents without the least treatment. They look at you and smirk: a typical concern of populations living next to

A soya plant



small rivers ! The flow rate of our river is so strong that it carries away everything. You can talk to the analysts. Everything's clean. As usual, the sea will act as the final dumping site. Even so, in Buenos Aires, certain people are starting to show concern. The leather industry has set up on the banks of the Riachuelo, which flows directly into the estuary. It is known to be one of the most polluted rivers in the world! However, the owners

of the slaughterhouses are reputed to be very close to the local authorities. Thus the purity of the water can wait.

Ideally and rationally, the development of a river in all its aspects (energy, transport, irrigation) ought to stem from a VISION.

But how can this common vision be built for such an immense basin shared by several countries jealous of each other's prerogatives and where the stakes are many and contradictory?

The decisions taken between the countries take a long time and, once the joint structure has been built, vigilance is constant and exacting :

there's no question of giving up an inch of sovereignty. Nonetheless, overall, the binational companies appear to operate efficiently, as was seen with the two giants, Yacireta (Paraguay and Argentina) and Itaipu (Paraguay and Brazil).

The problems seem to emerge more WITHIN the countries.

The central government of Paraguay has few powers, especially financial, to oppose the feudal

structure of the regions and the big landowners. Consequently, the two giant entities, Yacireta and Itaipu, represent kinds of states, powerful, rich and guardians of a semblance of general interest. Thus, in spite of the aggression they represent for the communities and the landscape, both dams respect the environment better than the agro-industry which shrugs off every constraint whether environmental or otherwise. The regional institutions of Argentina are becoming increasingly powerful at the expense of a global project.

Regarding this, the example of Rosario provides a wealth of information. At the end of February, the soya harvest is only just beginning. A few trucks have already arrived to tip their grains into huge silos, some of which can store up to 300,000 tons. Following quality inspections, different processing operations to diversify supply and sell at higher prices (for example, the addition of nutritive additives), conveyor belts carry the soya to ships waiting on the river. They are loaded to only two thirds of their capacity to make sure that their draught does not exceed the depth of the channel. The other third will be



The largest grain silo in the world

loaded downstream and the soya will go to the four corners of the Earth to feed forever more livestock.

But as with pigs, everything in the soya plant can be used.

Biodiesel can be made from it, even though it has led to Argentina being condemned by the

WTO for dumping. The export sales prices were lower than the cost price (Argentina offset the difference with its sales in the countries).

It can also be used to produce lecithin, a very useful and profitable gelling and emulsifying agent employed for many purposes.

More or less all the port's activities have

been privatised. Each company has its own installations. Cargill, Dreyfus, Glencore, etc.

The ports succeed and rival each other in gigantism and speed in reception and loading. Every hour lost is money that won't be earned. Beautiful villas can be seen between the piers



Loading soya at the port of Rosario in "Panamax" format.

testifying to already solid fortunes. But between the villas, in the lower stretches of the coast the shacks of shanty towns recall that soya does not make everyone rich. In front of certain cliffs where caves have been hollowed out, the captain of our boat whispers that they are used as warehouses for drugs. Rosario is not only a hub for soya and its peace has been disrupted. The consumption of coke has rocketed over the past few years and the wars between dealers have hardened. Rosario has become the most dangerous city in Argentina. The homicide rate is very high (22 per 100,000 inhabitants versus 0.7 in France).

The managers of the stock exchange say nothing about this curse. They vaunt their pride in the second place their city has earned behind Chicago as the world's busiest trading centre for agricultural products.

And because they think big, forever bigger, they are fighting so the Parana becomes a navigable waterway as active as the Mississippi, the ultimate reference.



Meeting at the Stock Exchange.

"Feeding the planet will become more and more difficult. Efficient agriculture means combining soil, sun and water. But logistics is the key and with the Parana, we have this key, provided that it opens doors or, rather, that it bursts open the locks".

Then a map is displayed ; also a dream.

"Look at this basin! It links the Mato Grosso and Sao Paulo to Buenos Aires, at the heart of the biggest farm in the world. Do you know

the figures? Transporting a ton by truck costs \$0.10, by train \$0.045, and by river \$0.02. This has to be demonstrated. This gain will be shared between the peasant farmers and us, the consumers and the planet, too, since we'll pollute much less. Ask rivers what they can give : they hold most of the solutions".

Thus speak and dream the tie-clad officials of the Rosario Stock Exchange, as warm as solemn, as ecological as pragmatic and financially minded. But they are geographers first. How can one refuse forging immediate friendships with them?

So, dear friends, what do you think of the Parana?

A glimpse of the quotations board of the old Rosario stock exchange, still stuck in the year 1929.



To end trying to convince you that it deserves attention, know that in Guarini, a language which decidedly expresses the logic of Nature so well, Parana means "like the sea".

The river flows into the sea at Buenos Aires after a long course of 4,000 km.

