

The River of Gold

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Great empires are not the creations of men who spend most of the day farming, or fishing, or hunting, but of those who spend their time taxing. The best location for a tax post is by a navigable waterway.

This chapter describes how riverine taxation led to the Trojan War of Greek mythology, how taxation furnished the Rhine Gold used for the Ring of the Nibelung of German mythology. The chapter starts at the sites of some of the earliest stories of human history, the flood myths. Floods desperately affect those who congregate and invest in low-lying areas. Livestock herders and merchants, nomads and hunters and gatherers would avoid these areas. The Floods of Gilgamesh and Noah, which happened in Mesopotamia, and of the Yellow River in China, needed a stable population to afflict, as well as some form of oral or written record keeping.

In the myths, human ingenuity, with divine guidance, perhaps, ensures that at least some of the population will survive. In China, hydraulic engineering saved the day, whereas in Mesopotamia, Noah's carpentry skills or Gilgamesh's construction of giant cities protected the pairs of animals; the organisation of humans prevailed over evil gods or Mother Nature. Large groups of humans that co-operated found an immediate advantage over their unmanaged neighbours in the face of a natural disaster. As a result, in China, the flood led to the first Chinese empire; while in Mesopotamia, the Flood led to the first Sumerian empire.

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If there was one river that should have become the centre of a world empire, it was the Rhine. The river is more than 1,320 kilometres long, with 883 of them navigable, and with an equal length of navigable tributaries. Unlike the Danube, the shorter Rhine is naturally navigable from Rheinfelden, in Switzerland just above Basel, all the way to the sea at Rotterdam and Amsterdam.

Higher up, Lake Constance, the Bielersee and Lake Neuchâtel provide more options for navigation; and tributaries like the Aare, the Main, and the Moselle extend trade and taxation further into the hinterlands. Alongside the river, great mountain ranges channel trade onto and along the river: the Alps along the south; the Vosges, the Eifel and the Ardennes to the west; the Black Forest and the Bergische Land to the east. In the south, the hills rise to more than a thousand metres and, in the colder north, they reach over five hundred metres. These hills suffer from snowmelt floods in spring, short growing summers, which limit the available fodder for travellers, and wet and cold autumns, which ruin the roads before the snow covers them in winter. Such geography forces merchants to use the Rhine.

With these advantages, the Rhine did not develop into the centre of a great empire. Like the Danube, for reasons of geography and humanity, it failed. On a few occasions, it did see some imperial passage. The lower Rhine formed the core of the Merovingian territory of Austrasia. From there, Frankish kings forced submission from their neighbours in modern Germany and France. Rivers featured little in their economy, and they did nothing to encourage trade or industry. The Friesians controlled the mouths of the Rhine, so the Merovingian power based moved to Paris on the Seine. In the time of Charlemagne, his disdain for rivers meant he kept his capital at Aachen, as far from a great river as he could get. His empire dissolved on his death. Charlemagne had convinced the pope to crown him emperor, and for a thousand years, Germans wore an imperial crown. These emperors tried unsuccessfully to tax German tax-collectors and German tax-payers. Instead, the emperors found that they had to bribe the locals to elect them to office. They found it easier to conquer Italians and Sicilians, and spent most of their energy south of the Alps. Finally, the Kaiser and Adolf Hitler used the power of the Rhine industry to conquer an empire, but both suffered in the most humiliating way possible.

The first documented tax-collector to suffer the Rhine was Caesar, who built the first bridge on the Rhine to enforce a payment of tribute. The Germans were not easy to subdue. Germany was too big, too wild, and the population required too much oppression to make them pay their taxes. The

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Rhine became the frontier with Germany, and then a defended border. The Romans joined the Rhine at Remagen to the Danube at Regensburg by a series of forts. The Romans did not leave a standing bridge across the Rhine, but they did leave a culture of taxation that ran all along the river from its mouth to the Alps, and included this southwestern corner of Germany, now called Swabia, that would provide all of Germany's most famous tax-collectors.

The Lords of the Ring

The most famous inhabitants of the Rhine are perhaps those associated with the Germanic myths that coalesced into the Ring Cycle of Wagner: the Nibelung, and the Rhine Maidens, whose carelessness starts the epic story. Most Romantic towns on the Rhine are perched high up on rocks, above the morning fog. Nobody would choose to live in the foggy swamps of the flood plains of the River Rhine, unless they could earn some money from doing so. Fog in German is *Nebel*, and the Nibelungs were tax-collectors who chose to do just that, live in the fog of the Rhine to tax passing trade.

The Nibelung Alberich is the thief who fashions a ring from the gold of the Rhine Maidens. Gods and men dispute its possession, leading eventually to their mutual destruction. Alberich's representation in Wagnerian operas is often Semitic, mirroring that of the court Jew in both western and Nazi propaganda as financiers, moneychangers and tax farmers. The accidental portrayal of Alberich as a tax-collector is probably a Freudian slip. Elizabeth I of England pointed out that a tax-collector could not expect to be loved, and the renunciation of love by the ring's possessor is confirmation of the tax role in this story.

The legendary Ring is made of gold, but the Nibelung made a real ring of iron. With multiple iron rings, he fashioned a long chain, which he floated with logs and strung across the Rhine. Any ship that wanted to pass, had to pay a tax. With the chain across the Rhine, the Nibelung tax-collectors were far more effective. They rapidly became rich.

The iron chains were unbreakable, but someone must have cut them at their ends at least once. The chain would have sunk to the river bottom. This bottom appears in the Nibelung legends as the source of the Rhinegold protected by the Rhinemaidens, and of the final resting place of Siegfried's treasure, thrown into the river by his bitter rival. Whoever raises the chain to start taxing will win enormous wealth.

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In historical terms, Burgundian tax-collectors managed the chain. They controlled the Rhine city of Worms from their arrival in the area in the year 413AD, when the Romans were looking for native Germans to defend the Rhine against other German incursions. Worms lies almost below the level of the water, defended only by the most perfunctory of levees, and filled with fog in the morning. It became a great capital. The taxes raised by the chain paid for the castle and walls and palace, and the great feasts and luxurious imports.

The battles to own this goldmine have passed into legend, but the semi-historical Burgundians were typical tax-collectors. Cursed by Alberich to forsake love, they lived in fortified castles and armoured themselves against irate tax-payers and jealous neighbours, only to die, murdered by the next thief of the Rhine Gold Ring. Meanwhile, cursed by the Ring and its ephemeral promise, everyone else joined the tax hierarchy dreaming that one day they would reach the top.¹

The Spires

Nobody reached higher up the tax hierarchy than the Holy Roman emperor. To celebrate his accession to the pinnacle of power, he built the tallest towers in Christendom, higher than anything built by the Romans, or by the popes. He built them at the halfway point of the navigable part of the River Rhine, thirty miles south of Worms. Speyer was the capital of the Salic kings, whose law that women could not inherit would provide the excuse for French and English kings to waste their tax-payers' contributions for a hundred years. Ironically, a Salic king produced no sons, and his vast wealth passed to the dukes of Waiblingen, through the female line. Before this, the Salic kings were in a war with the pope to decide who was most important. Speyer Cathedral was the result of this war.

¹ Chains have been used on other rivers in wars. West Point is today known for its military academy, but 200 years ago it was the site of a successful boom across the River Hudson, used to prevent the British from ascending the river. Chains were used by the popes to prevent raiders sailing up the Tiber; by the Venetians to protect their lagoon; by the Byzantines to protect the Golden Horn; by the Chinese to prevent armies sailing up the Three Gorges; and by the Americans to prevent the British from sailing upriver to Washington DC. Pontoon bridges were also used, either to cross troops or to prevent ships from passing. But there seems to be little evidence that chains were used elsewhere for tax collection. Narrower and shallower rivers, such as the outflow of the Rhine at Konstanz, were controlled by stakes driven into the riverbed. The Middle Rhine is too deep to allow this.

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Speyer is famous for its spires, but it does not get its name from them. Rather, the village of *Spira*, Latin for a coil of rope, was a tax point for the Romans, and the German tribe of the Alamanni who followed them. Unlike the rich Burgundians downstream at Worms, who must have been excellent ironworkers, the poor villagers of Spira could only afford a hempen rope to block the Rhine, but it was enough. When they built the first watchtowers, their village gave the name to spires, a pun on the German word for straw, *spīr*, a spear, or any long, tall, thin thing.

Students of architecture wishing to understand the fundamental difference between Romanesque and Gothic can compare the massive walls of the *Dom* to the lofty, airy Protestant memorial next door. A thousand years ago man piled stone upon stone to create the biggest, tallest building in Europe, perhaps the world.² Later justifications were religious, arrogant attempts to approach God, a pointer to His Heavenly works, uplifting inspiration for His little sheep. The reality was more mundane, *mondain*, moneyed. He built the Cathedral with one aim: to collect taxes.

Even today, the cathedral at Speyer dominates the town. Its effect in 1060AD must have been stunning. It was twice the height of Westminster Abbey, and from its towers a lookout could see the length of the flat plain down which the Rhine flows, twenty miles at least. This was enough to give a few hours warning before the ships, laden with goods from neighbouring towns, counties, countries, tried to pass Speyer. The spires were watchtowers, and the Romanesque architecture gives wide windows high up in the tower from which to look out in all four directions, unlike a typical church steeple or Gothic tower, which would not be well equipped for climbing or stationing a guard.

After the last Salic tax-collector, control of their territory passed to the local bishop. He owned the rights to tax those who crossed the river, east and west, land to land, and also those who sailed up or down the river, north and south. In return, he had to maintain the road that ran alongside

² The argument refers to whether a pyramid can be classified as a building. The Great Pyramid of Giza, at 146 metres, was the highest known building in the world from its construction starting before 2500BC until its supersession by Lincoln cathedral in 1300. Some claim that Old St Paul's cathedral in London had a higher spire than the pyramid but there is no evidence that supports this, and there is Christopher Wren's scientific calculation that it was not. This argument is pointless for historical buildings, as until the skyscraper was invented most of the upper height of these buildings, which were mainly spires on cathedrals and churches, were uninhabited; spires, unlike belfries which contain operating carillons, performed no active function. The pyramids were also uninhabited. Height in buildings is more a secondary sign of a state's economic wealth, and its engineering prowess.

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the Rhine. Younger sons of the gentry would join the chapter of the cathedral, to profit from and control some of its wealth. As with other great cities, the chapter itself became a source of power; it was gifted land and money; would tax its vassals; and would compete with the town, its guilds and the bishop.

In Speyer, spirituality had its first lasting success against the tax collection that had become the lifeblood of the Church. After Martin Luther protested against the Roman Catholic practice of selling indulgences, he was tried at Worms, banished and excommunicated. Eight years later, in Speyer, those who sought reform in the Church protested. The bishop of Speyer nailed the protest on the doors of the Cathedral, the start of the protestant movement. Speyer became the focal point for the religious wars that destroyed much of Germany; the town never recovered. Speyer Dom remains the largest Romanesque building in the world.

The White Gold

Speyer is no longer an important city on the Rhine. Foreign powers opened the Rhine to international traffic, tax-free, in the 19th Century; its tax-raising powers washed away to the distant Atlantic. The greatest economic benefit of tax-free oceanic access falls to the city with the greatest hinterland. That city, for the Rhine, is Basel, located at the highest point of the Rhine before the first rapids but geographically in the centre of Europe.

Basel and other big towns on the Rhine had always been important economic centres, but their importance had rarely stretched further than the next town on the river. Their weakness was the incessant taxation that made it prohibitively expensive to import goods in large quantities for processing and re-export. Only basic consumption could exist. Raw materials, because of their bulk and the inherent percentage of waste could travel only as far as one or two tax barriers. Grain, which could be imported from further away in an emergency could be imported, but not re-exported for general sale.

The Rhine is already a major river at Basel, carrying 1,000 tons of water per second. If Speyer is the mid-point of the Rhine, Basel is the end-point for ocean-going ships and barges. At Basel, ships unload and pay taxes with their goods carried off by land into Switzerland. Even today, taxation is a major industry in Basel, as the queue of lorries waiting to pass Customs testifies.

The site of Basel was occupied by Celtic tribes, and then by the Romans for many years. Germanic tribes took over, first the Alamanni and then the Franks, who built the first great church at the site of the present-day cathedral, on a large rock overlooking a tight bend in the river. Tight

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bends give good visibility in both directions to the tax-collector, but render the tax-payer blind. The bend also increases the speed of water and drives the boats to the outside of bend. When possible, tax-collectors build their cities on the outside of a bend, with their palaces slightly upstream, of the apex of the bend.³

The first well-organised tax-collector after the Romans was the Church. The bishop of Basel controlled the city until the 14th Century. He taxed trade along and across the river. Basel wasn't the first bridge across the Rhine: the burgers of Rheinfelden, 20 miles upstream from Basel, built a bridge where a little island almost halves the span of the river. The trade and profit that this attracted soon encouraged the Bishop to build his own bridge. Hauling upstream, Basel's bridge was the first one on arriving in Switzerland. The border with France was only just a few miles further north. The bishop built his bridge carefully, three-quarters, and one quarter out of wood with a drawbridge, so that ships that had paid their taxes could continue further upstream, as far as the rapids of Rheinfelden and their now useless bridge. Pictures of old Basel show the impossibility of avoiding the tax, heavily protected as it was on both sides of the river with walls.⁴

The bishops sought to enrich their city, bringing in bones from saints like those of Pantalus, a Basel-born bishop, and Ursula, slaughtered by the Huns along with 11,000 virgins. The bishop, and the nobles who supported him, grew rich, and built themselves palaces where they dined on plates of gold. Basel was so important to the life of the river that cities as far north as Freiburg and Karlsruhe still have southern gates called *Basler Tor*.

In 1356, the city suffered a major setback to its power-base, with an earthquake that destroyed many buildings, including most of the big palaces and churches. This was an affront to the dignity of the Church and nobility, and a cost to their pocket to rebuild. Unable to finance the rebuilding alone, they sought the help of the guilds, whose middle-class merchants and industrialists insisted on taking over power in the town. Basel was by now a major port on the Rhine. Its merchants traded internationally in salt, known as white gold for its value, saffron, shipbuilding, paper, building stone and timber. Its craftsmen developed engineering and industrial skills, using waterpower from the river to cut lumber, and to forge iron. The 4

³ Regensburg on the Danube and Paris on the Seine are built where a concentration of islands provides easier bridging. The Tower of London controls the gravelly ford across the Thames.

⁴ The French eventually built themselves a bridge at nearby Huningue, and for a hundred years it interfered with Basel, until it was utterly destroyed at the end of the Napoleonic Wars.

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merchant and 11 craft guilds would dominate the town for the next four hundred years. The guilds ruthlessly enforced their monopolies, as well as the hierarchy within the guild system. They would meet regularly to manage business and enforce their monopolies. These were men-only affairs, and they liked to dine in splendour but, as befitted their middle-class rank, they dined off silver plates.

The Church in Basel, meanwhile, continued its rather independent and tolerant attitude, electing an antipope at the 1440 Council of Basel, and eventually having the cathedral and many of the churches in the city destroyed by iconoclasm. Its tolerance meant that other than the statues it suffered relatively little in the convulsions that shook the Church elsewhere in Europe during the Protestant Reformation and the religious wars that followed.

The focus on trade and profit, and the freedom from feudal and religious oppression made Basel the centre for renaissance humanism, and later Protestantism, and this in turn led to book production and printing. Whereas Constance saw in the trial of John Hus and the Council of Constance the beginning of the Counter-Reformation, the Council of Basel encouraged immigration by freethinkers like Erasmus and Paracelsus and many others. Erasmus and Paracelsus lived in their printer's house that would later become the University of Basel's Institute of Pharmacology.

At the end of the Thirty Years' War, Basel led the demands of the Swiss for recognition as an independent and neutral country. France was suffering its own civil war, the *Fronde*, and Germany had suffered as much damage as it would in the Second World War. The exhausted European countries accepted.

The French civil war was eventually settled, with the bill to be paid by the Protestants. French Huguenots fled abroad, taking with them their technical and financial skills from the silk industry. Silk factories were set up all across Europe but mainly in protestant cities like Basel, which became a large-scale producer of silk and silk-cloth. Having suffered from oppression in their own country, the new arrivals refused to join the closed-shop guilds' system of Basel, and maintained free links with their co-religionists across Europe. They challenged the guilds for power and pushed for a free-trade city. Ultimately, the poor peasants in the local area, the *Baselbiet*, forced the issue, at the time of the French revolution, and achieved a change in government in the town itself. They opened the door to a French invasion, and to the occupation eventually of the whole of Switzerland.

The final piece in Basel's jigsaw puzzle of world domination was the Customs Union. In 1848, Switzerland, in the wake of the socialist

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fervour that was sweeping Europe, adopted a new constitution, which introduced a single Customs Union for all the 22 Cantons that made up the Swiss Federation. Basel could now export to all of Switzerland tax-free. Even better, in 1870, the French and Prussians went to war, and German victory brought both banks of the Rhine together, allowing much greater management of land and river improvement projects. The Germans adopted Napoleon's Rhine customs union and enforced it the length of the river, from Basel, where the Swiss charged customs, all the way to the Netherlands beyond Cleves. For the first time in 1500 years, it was possible to use the entire river in a cost-effective, almost tax-free way. Basel, furthest from the sea, benefited the most, able to import cheap raw materials at almost no greater cost than the coast cities, but able to export its high-value products to its hinterland, which now included all of Europe with only a single customs payment, and all of Switzerland with none.

A city inland, at the peak of high water, has a greater hinterland than a port on the coast. It should benefit from greater economic power, all other things being equal. In the same way, a city in the middle of a continent should be more powerful than one on the coast, as it boasts the greatest possible hinterland. Not all things are equal, but providing Basel with a tax-free route to the sea provided that equality.

Switzerland benefitted from another competitive advantage compared to the technology leaders like Britain, France, Germany and the United States: there was no patent law. Basel would take advantage of this in the industry that was leading the industrial revolution: coal. The development of the steel, rail and gas industries used charcoal, coke and coal, and produced coal tar as a by-product. The River Rhine was full of barges carrying coal tar from every city that lit its streets with gas-lamps, as well as from the great factories like those of Leverkusen and along the Ruhr. First, producers of this industrial waste just threw it away, but it was difficult to dispose of. Then, they turned it into soap, and advertised coal tar soap heavily, but its origins and smell made it unpopular and it remained a curiosity outside schools and prisons. Coal tar is also a precursor to mass-produced chemical dyes. The chemical industry evolved around this spare coal tar, and the tax-free basin of the Rhine. Patents protected the great technical advances in Britain, France and Germany, but they could not prevent Swiss chemists from marrying their daughters to French scientists, in the manner of medieval kings.

Basel's location at the head of the longest tax-free river in the world would benefit any industry, but it especially liked the role of global pharmacist. The alchemists and apothecaries of Basel had five-centuries' experience of buying chemicals and dispensing drugs without interference

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from the Church or state. They had developed a rich expertise, based partly on local plants, but also on the many imports that passed through in trade.

Basel had long been a centre for vegetable dyes, and the arrival of the silk trade with the Huguenots further developed the industry, as well as the financial services to support it. Drugs and dyes, both produced from plants, naturally combined in the same businesses. Geigy, founded in 1758, is one example. The first synthetic dye factory was built in Basel in 1859, a factory which eventually became one of the foundation stones of CIBA, the Chemical Industry of Basel Association, which would later merge with Geigy. The next year saw the building of the Basel Gas Factory, which would eventually become Sandoz Laboratories. As France introduced customs duties and trade embargoes on Swiss dyes to protect its own industry, the mountain people reverted to their traditional pastime and developed extensive smuggling operations along their mutual border.

Basel could also capitalise on its academic power. While the guilds controlled the city, they had set up the first and only university in Europe subsidised not by nobility or Church, but by merchants and artisans. Thus, it was particularly scientific in outlook from the start, not clouded by dogma. By the 19th Century, it sported Chemistry and Pharmaceutics departments, long before technical studies became popular in America or Britain. Switzerland was also the first country to eradicate illiteracy, in a policy started during the French occupation and led by another humanist, Pestalozzi.

During the Great War, Sandoz made the great breakthrough of combining the chemical industry with academia. It created a university research laboratory to develop new drugs, establishing the basic processes for drug development that their competitors now copy worldwide. Digitalis and ergotamine were their first successes, the latter leading CIBA and Albert Hoffman to produce LSD, with more popularity than pharmaceutical use.

By the 1930's, so many new developments were coming out of Swiss laboratories that they were forced to develop their own patent laws, a form of import taxation. This was during the rise of the Third Reich; Germany was not the only country with anti-Semitic policies or laws, and Basel was to profit from them. One of the first products patented was synthetic vitamin C from Hoffman La-Roche; its Jewish inventor, evicted by the strongly pro-German ETH University in Zurich, found friends in the cosmopolitan, even communist, Basellers who welcomed him to a Chair as head of the Pharmaceutical Institute. Here, he successfully isolated and led into industrial production the steroid cortisone, for which he was awarded the Nobel Prize.

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Today, the world's dominant pharma companies, Syngenta, Novartis and Roche, have their headquarters in Basel, along with many smaller companies. Novartis, the largest pharma company in the world, exports 99% of its turnover, alone accounting for 15% of all Swiss exports. The pharma companies are neighbours to a large chemical and industrial complex. The wealth of Switzerland flows out from this massive process industry, which turns cheap raw materials like water, salt, oil, and coal into expensive exports.

Mountain rivers provide power, first for water-powered machinery and then through hydroelectric power and coolant for nuclear and fossil fuel power stations. The Scottish-Swiss company Brown-Boveri was first to control this power industrially, in nearby Baden, and is now global power manufacturer ABB. Switzerland also developed factories, profiting from Italy, Germany and Austria's ill-considered wars to supply arms and ammunition, planes, machines and machine tools. Today, after Germany and Italy, Switzerland is the third largest machine builder in Europe, just slightly behind the United States, and the fifth largest exporter, as well as the largest consumer in the world of machine tools per capita.⁵

This heavy industrialisation belies the chocolate and milk image of Alpine Switzerland; a quick trip from Basel and up the Rhine's largest tributary, the Aare, past the five nuclear power stations, shows the reality. Watches make up 3% of Swiss GDP, 7% of its exports. Even so, the food sector is important; Swiss company Nestlé is the largest food company in the world. The largest part of Switzerland's industry is financial services. From UBS in Basel, through Credit Suisse in Zurich, to three hundred other banks in Bern, Lucerne and Geneva, Switzerland is the banking capital of the world. Switzerland holds thirty percent of the world's offshore funds. The bankers' bank, the Bank of International Settlements, is also in Basel, and the power of the banking fraternity is such that its employees have extraterritorial power on its premises. Insurance is also a major industry, at least, reinsurance, with Swiss Re the second largest reinsurer in the world. Gold is Switzerland's biggest export, which, together with jewellery and precious stones, makes up more than 20% of its exports.

Switzerland has eschewed a military empire, but has succeeded in creating a magnificent commercial empire. A combination of business-friendly tax policies, wise investment in improvement, and a concentration on industries that bring money in, or export high value goods made from

⁵ Source: Gardner Business Media, Inc. The World Machine Tool Output & Consumption Survey 2013.

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rubbish, has made Switzerland the richest country in the world. Basel has the highest per capita GDP in the world, but this was not always the case.⁶

The River of Bacchus

Basel and Switzerland benefited from the opening of the Rhine to tax-free trade, which happened during the 19th Century. Before this, although the tax-collectors in Basel were rich, the population in Switzerland was poor, malnourished, and lacking in opportunity. Hundreds of tiny tax-collectors, none of whom was able to concentrate cash sufficient to invest in improvement, operated on the Rhine. That industry survived, even flourished, is a tribute to the population and their love of wine.

A few miles north of Basel start the vineyards of Alsace and, for the next 500 miles, the Rhine is the river of wine. Farmers plant the south-facing slopes of the Rhine and Moselle with vines; the steep slopes are good for nothing else, and the vine roots help to stabilise the mountainside against erosion. From the river's edge, they can float the grapes to the vintners on barges. The vintners transport to market their heavy barrels of wine on the river. Only when vines are next to navigable waterways could this industry make a profit. Eventually, railways replaced the river.

In Roman times, the sides of the river were prepared for vines to souse the garrisons that kept the Germans out of France. Alsace and the rest of the wine producers along the Rhine fermented more wine than they could possibly drink, and they sought to export it to the rich and heavily populated regions in the north, Flanders and England, particularly. To get there, they had to run the gauntlet of the Middle Rhine.

The Middle Rhine, from Bingen to Bonn, vies with South Wales for the densest population of castles in the world; but, on so narrow a path as the width of a river, it is unique. Steep valleys and mountains on both sides make it ideal for tollbooths. The rich wine-growing regions of Alsace, Rheingau and Moselle had hundreds of vintners looking to export their produce, and they were easy targets. Wine was the most important commodity shipped along the river, and gave its name to the river. The locals called it Ara Bacchi, the River of Bacchus, after the Dionysian wine-

⁶ The 200,000 population of the canton of Basel-Stadt had a GDP of 167,000 CHF each, far more than Zurich or Geneva's \$100,000, often touted as the richest cities in the world in cheap Internet lists; Basel's figures are from its Statistical Office. Basel's other half, Basel-Landschaft, has a population of less than 300,000, but with a much lower GDP, as it incorporates the factories and their workers. Even with both half-cantons combined, their average GDP is higher than either Zurich or Geneva.

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god of the Romans, who first planted its slopes with vines. The name evolved to Bacharach.

The Middle Rhine had an uncountable number of tax points, including Bingen and Bonn, Drachenfels, Sankt Goarshausen, Stolzenfels, Ehrensbreitstein, Koblenz, Bacharach, Boppard, Rheineck, Pfalzgrafenstein, Rheinstein, Furstenberg and Lorch. Just the stretch between Bacharach and Bingen boasted 5 tax points, over a distance of 15 kilometres. The rest of the river also taxed: along the lower Rhine there were tax towers at Emmerich, Cleves, Nijmegen, Zons, Assmannshausen, Düsseldorf, Cologne and Brühl; along the upper Rhine there were more in Basel, Freiburg (Breisach), Speyer, Mannheim, Worms, and Mainz. Each city would have its means of enforcing tax payments: a cable of logs, armed boats, bridges; later, castles armed with cannon, *Mautturm*, the tax towers. On average, the Rhine boasted a tax every ten kilometres, each approved by the Holy Roman Emperor, in return for a tax paid to him, to operate a monopoly in that short distance. During the Imperial Interregnum, a period of twenty years when there was no emperor, robber barons inserted themselves into the tiny gaps between the existing tax-collectors, and extracted more taxes. The approved barons for once agreed to co-operate, and they combined their military forces to reduce the illegals, burning their castles and confiscating their booty.

Each tax-collector would take his 10%, thereby restricting trade to no more than 70km along this 1000 km river; in just those 70km the price of goods would have doubled, without any addition of value.⁷ As a result, the Rhine was more famous as a route for the Vikings, who rowed tax-free 400 km up river to Koblenz, than for the merchants exporting its wine.

Shippers paid tax on alcoholic drinks by the barrel, and avoidance created new industries. At Rudesheim, they distilled wine, shipped it downriver, and then diluted it back to a wine-like consistency. The tax avoiders had invented brandy, *Brandtwein*, from the German word *brandt* meaning burned.

Religious leaders managed to avoid taxes by negotiating exceptions, but they also managed taxes themselves. The archbishop of Mainz was tax-collector in Bingen and Rheinstein, two locations only 6 kilometres apart. The archbishop of Trier collected taxes in Furstenberg, Stolzenfels and Ehrensbreitstein on the Rhine, as well as on other crossings of his own Moselle.

⁷ This can be compared to Britain, with a much smaller territory and population, that developed a more powerful economy and sustained a greater population growth with its tax-free rivers, such as the 200km navigable Severn.

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There were so many rich men taxing the Middle Rhine, and there was so much wine travelling down the river, that the whole area became synonymous with any rich man's house, a *palace*, and the region became known as the *Palatinate, Pfalz*. No man became richer than the archbishop of Cologne. The largest city on the Rhine was probably Cologne for most of its history. Even today, the Cathedral diocese of Cologne is a billion Euro business, receiving on average €500 from each of two million Catholic parishioners, each year, giving some idea of the wealth of the global Catholic Church, with its one billion parishioners.⁸ Cologne was built on an island, which narrowed the river, and both Julius Caesar and Constantine built bridges here.

The archbishop of Cologne and the count of Berg at Düsseldorf waged a thousand year battle between them to control the area. The archbishop collected taxes at Brühl, Zons, Rheineck and Drachenfels, as well as at Cologne. The counts of Berg transferred their seat to Düsseldorf because of the mining opportunities. Düsseldorf escaped from the Second World War relatively unscathed; even though the Allies dropped 18kT of bombs on it, and killed 5,000 people, the good aiming of the RAF and the wide-open spaces of that verdant town saved it from the destruction that they meted out to its southern neighbour. Cologne was a much more densely packed city, and the 34kT of bombs there destroyed almost the entire city.⁹ This ensured that Düsseldorf would rule for the next 50 years, but Cologne has recently caught up.¹⁰

Other visitors up the Rhine were there for spiritual pilgrimages. The Rhine is dotted not just with toll-booths that look like castles but also toll-booths that look like churches: visitors still come from all over the world to see the reliquaries of Saint Apollinaris at Remagen, of Saint Servatius at Maastricht and of Saint Victor at Xanten.¹¹ Other sites of pilgrimage are

⁸ A €500 Billion turnover Roman Catholic Church would make it the non-state largest organisation in the world, and the 12th largest state, after the USA, China, Germany, Japan, France, UK, Italy, Brazil, Russia, Canada, and Spain.

⁹ In comparison, Hiroshima received an equivalent of 18kT TNT, and Nagasaki only 16kT. The word *only* is used comparatively, for Hiroshima and Nagasaki saw death tolls of a hundred thousand each.

¹⁰ The largest money earner in the area today is the Bayer factory at Leverkusen, in northern Cologne. It is the largest chemical plant in the world, where aspirin was invented. Bayer also invented heroin, phenobarbital, and the first antibiotics, but today is concentrated more in the agricultural sector.

¹¹ American pilgrims and Second World War buffs make the pilgrimage to Remagen to see the first bridge captured over the Rhine during the Second World War. Although German commandos managed to destroy it quickly, the bridgehead established

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secular. The hilltop where Siegfried killed a dragon, the Drachenfels; the rock where Brunnhilde fought Hiemhilde; and the other rock where the mermaid Lorelei sang, still draw tourists to contribute their little offering. The Lorelei was a mermaid who sang songs of such beauty that the entranced sailors crashed into her rock: as could be expected from a tax-collector, but not from a beautiful mermaid, no one loved her, so she threw herself into the Rhine. This classic tax-collector story grew out of a tax lookout post on a steep cliff, a *Lurelei*; the expensive encounter with a tax-collector; and the inevitable hatred for him that this encounter engendered.

Tourists that travelled the Rhine took away with them some quaint customs, as well as paying them. At St Goar, the tax-collectors would chuck a bucket of cold water over pilgrims, or dunk them in the river, unless they paid a fine and drank to the emperor's health. When Napoleon kicked out these humorous bullies, they took to salt water. Their activities became the Equatorial Crossing the Line ceremony, with Neptune replacing the German robber barons, coming on board and demanding homage. Those who cross the Line receive certificates to display at home, and it is not far-fetched to imagine that tax-payers and pilgrims who survived a dunking at St Goar would boast about it to their friends and family for years after.

The medieval castles of the Rhine are not all they appear to be. When the customs union of Napoleon put an end to local taxation, the castles fell into disrepair and, for most of the 19th Century, they were uninhabited. After German unification and victory in the Franco-Prussian War, the Prussian victors gained properties in the Palatinate, which included the tax towers. The Prussian tax-collectors started the craze for rebuilding castles along the Rhine in a neo-Gothic style.¹² What had started as tax and customs posts became royal palaces. The Wagnerian influence and love of war rendered them with a façade of military glory. The new owners' ancestors had progressed from murderous thugs through robber barons to efficient tax-collectors and absentee landlords, sometimes passing through or marrying merchants, financiers, miners, explorers, chemists, and engineers, to end up as uniformed soldiers in the Great War. Now, they could retire to their Rhine castle and play out a fantasy of knights in shining armour wooing damsels in distress, and killing dragons and robber barons.

Germany is a country that has struggled, mostly, to accept central authority, its Neanderthal heritage preventing any such thing as a nation

was never relinquished and US forces from Remagen were able to drive across Germany in only a few days.

¹² At about the same time in France, Viollet-le-Duc was doing the same thing at Carcassonne, and in England the Marquis of Bute spent his money building Castle Coch.

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united. In 1945, the Allies quartered its short-lived united territory and national capital. The western Allies installed the capital of the rump in Bonn, a tiny village on the middle Rhine, almost as an insult, but actually a recognition of the importance of this great river. It must have reminded locals of the great days of Worms and Speyer when the Rhine dictated the pace of the German economy.¹³

The Red River

The demand for calories from hard-working industrial workers in the Ruhr created demand for industrial agriculture. Fertiliser, monoculture and pesticides were the holy trinity. Germany refused to adopt the monoculture of its neighbours, but invented the industrial mass production of the other two, and the Rhine provided both the water and the communications that allowed it to do so. From Bonn to Duisburg, and with its tributary of the Ruhr, the Rhine incorporates coalmines and power stations, chemical factories like that of Bayer, and Europe's largest steel industry. It wasn't always like this.

For much of this part, the area west of the river is swamp, still visible today on a map by the place names ending in *-broich*, but east of the river, there was higher land, the Bergische Land. The German word *Berg* means a mountain, but it also implies the mines commonly found in mountains. One of the right tributaries of the Rhine is the powerful mountain stream of the Düssel, which provided water for mills. The valleys also provided limestone, iron ore, and wood to make the charcoal necessary to smelt it. The capital of the Bergische Land is Düsseldorf, which sits where the river Düssel joins the Rhine.¹⁴ Here were the factories that produced components for textile machines and agricultural tools. Berg was rich enough that its landlord lived, not in cold, damp Düsseldorf, but in Italian Mantova, with Vivaldi as Court Composer.

The wealth of Berg was relative. Relative to the wealth of industrial Britain, Berg was a backward land, with little industry, little technology, and little mass production. It produced enough for its own needs, but not to

¹³ Bonn was selected for a number of reasons, but all possible cities were on the Rhine. The new chancellor of West Germany was from Cologne and had studied at nearby Bonn.

¹⁴ The river Düssel flowed through a narrow gorge which came to be called Neanderthal in the 19th Century. Although much built over today, the Düssel floods onto the plain on which Düsseldorf is built, creating a swampy delta that was easy to drain, and providing the basic outline and the moats for the medieval town.

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create a vibrant export. Taxation prevented any significant development of trade and the division of labour necessary to manufacture complex machinery. The Napoleonic Wars saw this part of the Rhine released from the taxation of the robber barons of the Middle Rhine and the Dutch at the river's mouth. After twenty years of war, peace also brought Britain's great technological advances to the eyes of the surprised Europeans, who quickly copied the most important parts, especially those that related to coal, steam and iron.

When the prime motive power of local industry changed from mountain water to steam, fuel changed from wood charcoal to coal and coke, and the product moved from textiles to metals, industry moved out of the hills. It moved to the flat plain north of the Ruhr, where there was lots of coal and iron, and easy transport to Duisburg. Duisburg was always a key port on the Rhine but, even so, in 1800 its population was only four thousand. Within ten years of the end of the wars, Duisburg had become the biggest port on the Rhine.¹⁵ The Ruhr itself became the largest industrial centre.¹⁶

This German challenge for world domination came not from the fast-flowing Rhine, but from the swamps of Prussia. For, as well as removing taxes and providing access to new technology, feudal Germany still needed education, capitalist skills and a growing population to convert this into an empire. The Prussian army that had fought at Waterloo conquered huge chunks of western and southern Germany; included among these was Berg. The result was a Prussian territory that stretched from Polish swamps to the Bergische swamp, but included the nascent Ruhr. Ambitious young men swarmed into the tolerant, modern state and the Ruhr became their playground.

The Ruhr is a gently sloping coalfield a mile thick. It includes every type of coal from soft, brown lignite to hard, black anthracite. Unusually,

¹⁵ Duisburg town was utterly destroyed during the Second World War, as it was at the western end of the Ruhr, and the prevailing wind blew the industrial smog over its neighbours, but kept it clear. The Ruhr was heavily defended but the cities closest to England, like Duisburg had less warning than their neighbours. Ports, industrial facilities and underground mines were little affected by such bombing, and it was mainly the residential districts that suffered. The RAF dropped 30kT of bombs in total, equivalent to two Nagasaki atomic bombs, but even after the largest raid of the war, with 9kT of bombs, half a Hiroshima atomic bomb, the local coal mines were back in production after a week. Duisburg had 80% of its residential buildings destroyed, compared to Recklinghausen, which was a centre of the oil industry, but was west and north, which suffered only 15%.

¹⁶ Duisburg remains the largest inland port in the world, and the *Ruhrgebiet* is the largest urban area in Europe.

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it has suffered little geological folding, making mining operations easy. At its southern end, this bed of coal is near the surface, and the river Ruhr cuts into it enough for surface miners to dig coal out with their hand-tools. As the miners advanced down the seam, so the miners moved north, where the coal bed was deeper, and they sunk mines, deeper and deeper. The first move was to the line Duisburg-Essen-Bochum-Dortmund, early in the 19th Century. In the middle of the century, the mines moved to Oberhausen, Gelsenkirchen and Herne. In the late 19th Century, mining moved to Gladbeck, Recklinghausen, Marl, and Herten.¹⁷

In the tax-free area controlled by Prussia, and with Prussian fear of the French, following invasions by Charlemagne, Louis XIV, Napoleon I and Napoleon III, there were no bridges across the Rhine below Cologne. The German Army built bridges there during World War I, when it reversed the popular direction, but the Allies or the Germans destroyed them during the Second World War.

If the Rhine is huge at Basel, it doubles in size before reaching the sea. At Nijmegen, the tax-collector forced all sea-going ships to stop, unload, and weigh their goods. After the tollhouse, the next biggest building in Dutch and German towns along the lower Rhine was usually the *Waag*, the weighing house. Nobody wanted to unload low-cost goods for the process industry more than once, so most trade along the Rhine in Medieval times was high-valued spices, silk and woollen cloths, and tools. The process industry for which the Rhine is famous today, chemicals, pharmaceuticals, coal gas and oil, only started with the removal of these tax stops.

Below Emmerich, the mouth of the Rhine is a confusing delta where the Meuse also mixes in and the Scheldt arrives close, too. The Romans perhaps dug a canal to join the Rhine, which usually flows west, to the Ijssel, flowing north, to help them in their campaigns against the Frisians, but just adding to the confusion.¹⁸ Other streams that flow north include the Kromme Rijn, then the largest stream, which has now silted up, and the Amstel. The Dutch, Flemish and Friesians have since dug thousands of miles of canals.

¹⁷ Today, the mines are a mile deep. The last deep mines will close before the year 2020, uneconomic in a global tax-free world.

¹⁸ When the Allied military planners prepared *Operation Market Garden*, they overlooked this river. Even if the operation had been a success, and the bridge at Arnhem had been captured intact, the army would still have been stuck behind a sizeable branch river to cross. It was less a case of *A Bridge too Far*, than of *A Bridge not Far Enough*.

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Silt, storms, canals and taxation have changed and shaped the Rhine delta. Dorestad was the first great trading city while the Rhine still flowed mainly northwards. Dordrecht took over when the channels opened to the west. It was destroyed by a storm. Utrecht was important until it was blocked by Amsterdam's tax barrage. Protestant Amsterdam was the richest city and the largest port in the world, and the capital of a global empire. The Amstel, too, silted up, closing off Amsterdam's access to the Rhine. More canals were cut. Rotterdam finally cut its last sod to reach the Rhine the year after Bismarck created the German Empire. This was a happy investment. When Germany became the world's greatest importer and exporter, Rotterdam became the world's biggest port.

The canalisation of most of the Rhine from Basel to the sea now prevents silt from affecting it too much, but storms and floods are still a major concern. By 2000, the Rhine Delta Plan closed off all access to the sea except at the ports of Antwerp and Rotterdam. The works protect the delta area from the worst storms that could occur in 10,000 years, and from river flooding for 1,250 years. For now at least, it seems that the Rhine is safe from natural hazards and from tax-collectors. It is still, however, under threat.

The only coalmines that will remain open in Germany after the closure of the deep Ruhr ones are the opencast lignite mines that fuel its power stations. In the most disastrous environmental policy, the Green Party forced Germany to close down its nuclear power stations, but has done nothing about the lignite coal power stations. Campaigners claimed for years that they cause acid rain, and do kill thousands a year, but when given the power to do something about it, they attacked cheap and clean nuclear power.

The BASF factory at Ludwigshafen, the largest chemical plant in the world, uses two million tons of water a year, 2% of the flow of the river Rhine, mostly for washing pollution out of product. With Bayer, the Basel pharma and chemical industries, the Ruhr basin coalmines and steel mills, and all the ships and barges transporting these heavy products, the Rhine became the most polluted sewage channel in the world. The final straw was the accidental release into the river of tons of chemicals from the Sandoz factory at Basel. This killed all the fish in the river and turned it red. The accident helped drive environment improvements which the Green Party had failed to promote. Fish populations have returned and Atlantic salmon are again swimming the thousand kilometres up river to reach Basel.

If the Rhine has been instrumental in the creation of Germany's national wealth, its contribution to global empire building is paltry. Germany's global empire consisted of a few territories in Africa, today's

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Tanzania, Namibia, Rwanda and Burundi, Cameroon and Togo, and some islands in the Pacific, leaving a heritage of German names in the Bismarck Archipelago and Kaiser-Wilhelmsland, and occupation for barely ten years of the islands of Samoa, Nauru, Bougainville and a few others even less known. This is a disappointing tally for such a long and powerful river. German colonisers narrowly lost the pleasure of selecting German as the official language of the United States of America, and though there are still large German-speaking colonies in Paraguay, Argentina and the United States, they are now independent of the Rhine.

Canals link the Rhine to the sea through Amsterdam and the IJssel, and through Nuremberg to the Danube, and from the Meuse to the North Sea through the Scheldt. Aquatic animals from both river systems have migrated into the other. Human migrants also traffic along the rivers, usually from Asia to Europe, but, so far, there has been little trade effect. Most industrial goods now cross Europe by lorry.¹⁹ When all routes are taxed equally efficiently, equally heavily, the trader can choose the most efficient for his goods and customers. The role of the river, both as a trade corridor and a tax opportunity, has been reduced thanks to automated taxation and the much higher speeds achieved on roads, even across mountainous districts. The hills of Germany are no longer an obstacle to traffic. A truck driver can cross Europe in a matter of days and return home by the weekend, while his barge captain counterpart would take the better part of a month. A river is no longer necessary to tax trade.

Two thirds of Europe's inland waterway traffic uses the Rhine. The Rhine is responsible for 80% of Germany's inland shipping, leaving just 20% for the Danube and the Elbe combined. The area from Constanta on the Black Sea to Rotterdam on the North Sea is a tax and customs union, and one of three economic powers in the world. The Rhine is a single tax-free area, governed under the Mannheim Convention by the Central Commission for Navigation on the Rhine, operating since 1816 and the oldest inter-governmental organisation in the world. The Rhine delta is one of 3 or 4 of the most densely populated areas of the world.

The Rhine has redeemed itself, and has returned to its position as the most important river in Europe, axis of the greatest industrial base in the world, and major hub of the Blue Banana, the economic centre of the European Union.

¹⁹ 1.7 Billion Tkm in 2015, according to EU Statistics, by road, 0.4 Billion by rail, 0.14 Billion by canal and river.

