a future paper, are on the very edge of huge areas of depression. As I remarked in my former paper on the Northern Polar area, if volcanoes be the violent efforts of the eruptive forces of the earth, it is remarkable that they should be absent, or only present in such feeble examples, in this area, and that we shall search such markedly rising areas as Australia, Tasmania, and South Africa in vain for them. My explanation of this absence, which involves some very heterodox views on the subject of volcanic energy, I must reserve for another occasion.

XVIII.—Geographical Notes on the Province of Minas Geraes.

By Henrique Gerber, c.e.

[Translated and Communicated by Capt. R. F. Burton.]

Preliminary Note.

In the Preliminary Essay (pp. 12, 13) of my "Highlands of the Brazil," I have given my reasons for translating into English the meritorious labours of M. Gerber, c.e. It is well that the world should know how much geographical work is still carried on in a quiet way throughout the Empire, of which there is hardly a province without its "White of Selborne," whilst not a few have from two to four monographers.

Of course these labours, however meritorious, are mostly compilations from official and other documents, and thus they often perpetuate the errors of the originals. On a certain map the town of Sabará is placed upon the left instead of being on the right bank of the river; and as I have noticed in the "Highlands of the Brazil," the great ranges of the Piedade and the Curral d'El-Rei have been counter-marched by M. Gerber.

A trigonometrical survey of Minas Geraes would, it is calculated, employ three engineers for five years, and demand for the roughest execution a sum of 80,000l. Meanwhile we must rest content with the preparatory studies of which the following is a good specimen. It is also an excellent base upon which to work in future times, and it will present a bird's-eye view of the "Great and Heroic Province."

My share in the work requires no notice beyond the fact that I am answerable for the short notes appended to the author's text. During the time of my visit to Ouro Preto, M. Gerber had left it, on temporary leave of absence, with the view of visiting the Exposition of Paris. I have already made my apology for translating him without his express permission.

Richard F. Burton.
I.—GEOGRAPHY OF MINAS GERAIÉS.\

Extent and Limits.

The Province of Minas Geraiés lies between the parallels of S. lat. 14° and 25°, and the meridians of W. long. (Greenwich), 46° 15' 50", and 56° 15' 50".† The extreme length is thus 9° = 540 geographical miles, and the breadth 4° = 240.‡ The area is calculated to contain 20,000 square leagues, (of 25 = 1° at the equator), or 180,000 square miles English.§

The boundaries are:—

North the Province of Bahia, the frontier being the rivers Caruahanha, Verde, Grande and Pequeno, (Royal Decree of March 16th, 1720); the Serra das Almas and a line drawn through the mountains of Cruzeiro, the Vale Fundo, the junction (serra) of the Musquito River, and the Salto Grande Rapida, (caehoeira) of the great River Jequitinhonha.

To the east lie the Provinces of Bahia and Espirito Santo; the demarcation being made by the range (serra) of the Aimorés; the Serra de Souza and the ridge (espigão), which divides the rivers Manhuassué and Guandú. Thence it follows the Serra dos Pilões, as far as the River Stabpanama, according to the Decree (Alvará) of December 4, 1816, approving the convention made on October 8, 1800, between the Governors of Minas and Espirito Santo.¶

On the south, Minas confines with the Provinces of Rio de Janeiro and São Paulo. The former extends to the Rio Preto (alias Negro) as far as its debouchure (foz) into the River Paraíbybuna; the River Paraíbybuna till it falls into the River Paraíbyba, and the River Paraíbyba till its junction with the River Pirapitinga. Thence to the north the limits are laid

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* "General mines," meaning that gold was generally found there. Presently many other metals were discovered, and it came to mean "mines generally." The Minas in part of the Empire were known as "Geralistas."
† Or between 4° and 7° west of Rio de Janeiro. The Brazilian geographers have imitated the best example of Europe in the matter of first meridians.
‡ The limits assigned by Garinei (chap. xii.) are between 8, lat. 14° and 22°, and W. long. (G.) 41° to 53°; 54° being the most westerly point, and nearly a narrow corner.
§ If the area were quadrilateral it would number 180,000 square miles English. At present the area of Minas Geraiés is about 1/14th of the Empire.
¶ The words of the Convention are—"It was agreed upon by all, that . . . . the limits of the two neighbouring capitaneias having to be demarcated, the boundary should be the ridge running north to south between the Rivers Guandú and Main-assai, and not by the river-bed . . . . that the slopes of the said ridge draining to the Guandú shall belong to the district of the Captaincy or new province of Espirito Santo, and that in the parts north of the Rio Doce, the division should be made by the Serra de Souza, which rises (to say toda elevada) in front of these Quarters (quarto, a barracks) and Port of Souza, and which accompanies from it (the Port) the Rio Doce, till it confronts the ridge before named." . . . . etc.
down by Decree No. 297 of May 19th, 1843.† On the side of São Paulo the frontier follows the crest of the Mantiqueira † from the sources of the Rio Preto to the Morro do Lópo; thence to the mouth of the Ribeirão das Canoas into the Rio Grande; and, lastly, along the Rio Grande to its confluence with the (southern ‡) River Paranáyba. This terminal line is badly laid down, and has caused many agrarian troubles between the provinces.

On the west are conterminant S. Paulo and Goyaz. The bourn is the (southern) River Paranáyba from its mouth to the embouchure of the Rio de S. Marcos; up the latter to the watershed forming its versants (vertentes), and, lastly, the chain (cordilheira) which extends northwards to the Vão Grande.§

The areas of the several Comarcas are as follows:—

<table>
<thead>
<tr>
<th>Comarca</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ouro Preto</td>
<td>230 sq leagues.</td>
</tr>
<tr>
<td>Piracicava</td>
<td>1,120</td>
</tr>
<tr>
<td>Serro</td>
<td>1,870</td>
</tr>
<tr>
<td>Jequitinhonha</td>
<td>1,920</td>
</tr>
<tr>
<td>Rio Pará</td>
<td>1,150</td>
</tr>
<tr>
<td>Rio do São Francisco</td>
<td>3,550</td>
</tr>
<tr>
<td>Rio das Velhas</td>
<td>800</td>
</tr>
<tr>
<td>Paracatu</td>
<td>2,100</td>
</tr>
<tr>
<td>Índia</td>
<td>550</td>
</tr>
<tr>
<td>Paranáyba</td>
<td>1,100</td>
</tr>
<tr>
<td>Paraná</td>
<td>1,500</td>
</tr>
<tr>
<td>Sapatuanhy</td>
<td>680</td>
</tr>
<tr>
<td>Jaguary</td>
<td>440</td>
</tr>
<tr>
<td>Rio Verde</td>
<td>420</td>
</tr>
<tr>
<td>Rio Grande (Paraná)</td>
<td>600</td>
</tr>
<tr>
<td>Rio das Mortes</td>
<td>340</td>
</tr>
<tr>
<td>Baependy</td>
<td>310</td>
</tr>
<tr>
<td>Paranáyba</td>
<td>340</td>
</tr>
<tr>
<td>Pombá</td>
<td>250</td>
</tr>
<tr>
<td>Muralhó</td>
<td>410</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>20,000 sq leagues.</td>
</tr>
</tbody>
</table>

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* The Decree is as follows—"Beginning from the mouth of the Pirapitinga opening into the Paranáyba, ascending the said Pirapitinga to a point forming the junction of the large Rivulet (ribeirão) Santo Antonio (da Padua) with the River Pomba, and thence by a right line to the said junction of the Santo Antonio, going up the rivulet to the range known as the Santo Antonio, and thence to a village (邨or) on the River Muriáhi, called Povo Fundo, running with the Serra do Guirão to the Cachoeira dos Tombo in the River Carangola, and following the Serra Carangola, till it meets the province of Espírito Santo.

† Less correctly written "Mantiqueira;" the word is said to be derived from the bandit: formerly infesting the range.

‡ I have added Southern to distinguish it from the Paranáyba of Piauí.

§ Vão with a circumflex (Latin, vana, empty) is an open unoccupied place. Vão (Lat. vânum) is a shallow, a ford.
Orography.—Minas Geraes is traversed by the main chain of the great orographic system of the Brazil, significantly named by the Baron von Eschwege "Serra do Espinhaço" (Range of the Spine†). This line, with its ramifications, divides the waters of the Rio Grande (Paraná) on the west from those of the São Francisco and others which feed the Atlantic. Bifurcating from the Serra do Mar (the Maritime Range) in the Province of S. Paulo, it takes the generic name of "Mantiqueira," and runs north-east to the parallel of Barbacena: thence it trends almost due north as far as the Cidade Diamantina and, lastly, resuming its north-eastern rhumb, it exchanges the Province of Minas for that of Bahia in the vicinity of the Villa do Rio Pardo. Its mean elevation does not much exceed 1000 metres (3280 feet) above sea-level, far inferior to the mighty Andes. Yet some of its peaks are the loftiest in the Empire, especially the Itatiaia, near the Villa of Ayuruoca (Jurucuá‡), which rises 1900 metres,§ Itacolomi to the southward of Ouro Preto with 1750, and the Itambé near the Cidade do Serro with 1316 metres.

The chief branch of this Cordilheira is a range which, leaving the main line at a point called "Alto (or Morro) das Taipas," a few leagues north of Barbacena, runs irregularly through the Province in a general east to west direction, and divides the waters of the Rio de São Francisco from those of the Rio Grande (Paraná). In old maps it is called Espigão Mestre (Master-chain) and Serra dos Vertentes (Range of Versante),‖ because this line and its continuations in the Provinces of Goiás and Mato Grosso separate the great southern basins of the Paraguay and the Paraná from those of the São Francisco, the Amazons and the Tocantins to the north, and thus divide the Empire into two distinct parts. The most remarkable portions of the system in the Province of Minas are the Serras, known as da Canastra (of the Box), and da Mata da Corda (Forest of the Cord, i.e., long and narrow). Its mean elevation is not more than 800 metres above sea-level, although many points

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* Henderson (Travels, &c.) remarks with truth that Minas Geraes is "the most mountainous country in Brazil."
† I have elsewhere specified my objections to this generalization.
‡ More commonly jurucu, the parrot's home, from Juruj or Ayuru, a parrot, and Oca, a house. The popular name of the peak is Morro da Serra (Saddle-back hill), and it shows well from Resende on the Parahybas River.
§ This is an important error. The Instituto historico e geographico Brasileiro (Revista Brasil, 1861) estimates the altitude at 3140 metres. Thus it is the culminating point of the Brazil.
‖ I have described the Serra dos Vertentes in treating of the Algôa Dourada; it is an east to west buttress of the great chain which runs south to north, and it separates the system of the São Francisco and the Paraná. There is another intertitudinal line which disconnects the Tocantins and the southern waters.
rise higher. As a rule a great portion of the ridge, and especially of its ramifications, forms plateaux (chapados) at times of great extent; these give a more amene character to the western parts of the province than can be found amongst the scarped valleys of the main system, the Serra do Espinhaço.

These two main trunks of the Mineiro* orographic skeleton have many limbs and ribs, which, however, may be reduced to the following main divisions.

1st. The Mantiqueira group, known by different local names, as Serra de Itajubá, do Picuí, do Itacuã; do Bom Jade; do Itirupé, do Sapateiro, and others. The highest points are the Itacuã, the Picuí do Papagaio; the Picuí de Itirupé, and the Pedra de Jaduia, etc.

The ramifications are—

N.E. The chain which under various names divides the waters of the Mogi Guassú and the Sapucaí rivers. The Serras de Santa Catarina and da Campanha (of the Champaign), between the Rivers Sapucaí and Verde; the Serras da Garapa (of the Martingale), de S. Thomé das Letras (Saint Thomas of the Letters), das Tres Pontas and da Esperança between the affluents of the Rio Verde and the Rio Grande proper.

S.E. The Serras Negra, de Monte Verde, and do Funil, between the Rivers Preto and Paraiba; the Serras do Planígio da Bahia, do Espírito Santo, Rio Pardo and Leopoldina, between the Paranaiba and other tributaries of the Rivers Parahyba and Ponta; the Serras da Caramônia, de S. Sebastião and do Brigadeiro, as well as all the chain extending to near the city of Victoria, and dividing the Valley of the Rio Doce from the Rios Ponta, Muriaçu, Ita吊unia and Ingemirim.

2nd. The Itacupum group, similarly called Serra do Ouro Branco, Ouro Preto, Cachoeira, Caraça, Cachá, Caché, etc. The greatest heights are the Picuí da Serra da Piedade, the Itacupum, the Picuí da Itacabira do Campo and Itacabira do Matadouro.

The ramifications are—

W. The Serras of Ouro Morte, Piedade, Curral, Salto, and Espírito Santo, forming the division between the Rivers Parnaiba and das Velhas.

E. The Serras do Inconfidendo and da Paiva Moreira, the water-parting between the Rio Doce and its tributary the Pinheirão; and the Serras da Itacabira do Matadouro and de Cacau, the parting between the rivers Pinheirão and Santo Antonio.

3rd. The Serro Picuí group, locally known as Serra de Santo Antonio da Lapa, Jambé, etc. The highest peaks are the Jambé and the Tromba d'Anta.

The ramifications are—

* The adjective derived from Minas (Germans).
† A peão (or footman), a "pawn" at chess, a cenital hole, a cone.
‡ Henderson ('Travels,' p. 290) describes this superstitions hieroglyphy, which reminds us of the "Men Scryns," or written stone of Cornwall, as a formation of corneous particles in elastic sandstone. He alludes to a vast and curious cave, and to a hermitage dedicated to Saint Thomas.
§ The small fish which gave a name to the vast province of Piauí.
‖ The word implies, from two remarkable salient knots, large and small. There is another hermitage mentioned in the text, called Serra do Caraça, from its likeness to a large face, or rather to the negro who wore it.
W. The unimportant ranges all draining into the Rio das Velhas.

E. The Serras de Capanga and das Correntes, dividing the Rio de Santo Antonio from the Sasseclay Grande; the extensive chain from the Pico do Itambé to the Serra dos Aimorés, with sundry secondary branches (amongst them the Serra Mapu-Mapu-Guaia), which separate the waters of the Jequitinhonha and the Aranhaú from the rivers Doce, Mucury, &c.

4th. The Itacambira group, with the local names Serra de Congenhas, do Itacambira, from its most notable peak; Gáro Mogol,* Branco, das Almas, &c. The principal ramifications are:

N.W. The extensive range from the Serra dos Venados and the Montes Claros to the Serra das Contendas and de S. Filipe, dividing the R. de São Francisco proper from the Rio Verde.

E. The jagged range stretching from the Serra Branca to the Serra Escura, separating the waters of the Rivers Jequitinhonha and Pardo.

II. System of the Serra Geral (draining into the Rivers de São Francisco and Grande).

1st. The Serra das Vertentes group, properly so called, and locally named Alto das Taipas, Montanhas da Lagoa Bonita, da Barba de Bode, da Serra dos Pinheiros, de Piumby, &c. The chief ramifications are:

N. The Serras do Itatiaia and, d. do Pará, da Queimada, dividing the waters of the Paraiba from those of the Pará; the Serras Negra and de Santo Antonio do Monte, dividing the Rivers Pará and the Upper S. Francisco.

S. Several unimportant ranges distributing the various tributaries of the Rio Grande, such as the Rio das Mortes, the Jacaú, the Lamyria, &c.

2nd. The Serra da Canastra group, whose principal mass is a few leagues east of Descobrimento and Arraial; it is interesting, as it contains the headwaters, or sources (caos) of the Rio de São Francisco, which is distant only four leagues from the banks of the Rio Grande. The ramifications are:

W. and N.W. A narrow spine, which presently spreads out into a vast plateau, containing the Municipalities of Ubá and do Prata, and known as the Chapada do Tumatinga: it forms the division between the waters of the Rio Grande and those of the Paraiba and the Serra da Pará, the division between the Rivers Das Velhas, Paraná, and Quebrás-AZH.

N.E. The Serras da Marcella and das Saudades do Indaiá, forming the division between the São Francisco and the Indaiá.

3rd. The Serra da Mata da Corda group, an extensive and important range running northwards almost to the confluence of the R. Paquetá with the S. Francisco. Its ramifications are:

W. The mountains do Patrocinio, the Serras Negra and de Cristaes, which divide the R. das Velhas and the Paraiba.

E. The Serras do Borrichudo and da Jaceí between the Rivers Indaiá and Abaeáé.

* More generally written Gáro Mogol.
† Cabeceiras are "head waters" or "sources." M. Auguste de Saint-Hilaire III. i. 141) says that in places "vertentes" means "sources."
‡ This must not be confounded with the Indaiá in the Mantiqueira Range.
§ More generally written Descobrimento.
|| More generally written "Abaeté."
N. The Serra da Mata da Corda, between the Rio de São Francisco and do Sonno; the Serra do Andreguçu (Andrew's knife), between the R. do Sonno and the Rio Catina; and the Serra das Almas, between the R. Catina and the Paracatu.

4th. Serra dos Pyrenæos group; one of the loftiest cordilleras of the Province of Goiás, which extends its branches to that of Minas; the arm which divides the two provinces runs north to south under the local names of Serra do Paranã, de Itiquira, Pinhães, &c. From the eastern sides of these ranges rise various tributaries of the S. Francisco, as the Rivers Paracatu, Preto, Urucui, Paroa, and Carunhambó.

### Table of the Elevation of All the Different Points in this Province Above the Level of the Sea

<table>
<thead>
<tr>
<th>Municipality</th>
<th>Names of Places</th>
<th>The Elevation in Metres</th>
<th>Measurements taken by</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ouro Preto</td>
<td>Peak of Itaoumi</td>
<td>1750</td>
<td>The author</td>
</tr>
<tr>
<td></td>
<td>(The palace of Ouro Preto)</td>
<td></td>
<td>Ditto</td>
</tr>
<tr>
<td></td>
<td>Courtyard</td>
<td>1145</td>
<td>Ditto</td>
</tr>
<tr>
<td></td>
<td>Village of Guara Branco</td>
<td>883</td>
<td>Ditto</td>
</tr>
<tr>
<td></td>
<td>Village of Duarte</td>
<td>850</td>
<td>Ditto</td>
</tr>
<tr>
<td></td>
<td>Village of Itaoumi</td>
<td>1037</td>
<td>Aroaera</td>
</tr>
<tr>
<td></td>
<td>Village of Teixeira</td>
<td>890</td>
<td>Ditto</td>
</tr>
<tr>
<td></td>
<td>Village of Congonhas</td>
<td>853</td>
<td>V. Eschwege</td>
</tr>
<tr>
<td></td>
<td>Campo</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Village of Itaoumi</td>
<td>870</td>
<td>Aroaera</td>
</tr>
<tr>
<td>Quebradão</td>
<td>The peak of Itaoumi</td>
<td>1280</td>
<td>Ditto</td>
</tr>
<tr>
<td></td>
<td>Village of Cattas Altas de Noruega</td>
<td>717</td>
<td>V. Eschwege</td>
</tr>
<tr>
<td></td>
<td>Village of Boa Vista</td>
<td>888</td>
<td>Ditto</td>
</tr>
<tr>
<td></td>
<td>Village of Snauhl</td>
<td>938</td>
<td>Ditto</td>
</tr>
<tr>
<td>Mariana</td>
<td>City of Mariana</td>
<td>728</td>
<td>Ditto</td>
</tr>
<tr>
<td></td>
<td>Village of Camargos</td>
<td>761</td>
<td>Aroaera</td>
</tr>
<tr>
<td></td>
<td>Village of Infanta (the chapel)</td>
<td>843</td>
<td>Ditto</td>
</tr>
<tr>
<td></td>
<td>(in the south)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Village of Paula Moreira</td>
<td>543</td>
<td>Ditto</td>
</tr>
<tr>
<td></td>
<td>(Path at the top of the mountain)</td>
<td>1119</td>
<td>V. Eschwege</td>
</tr>
<tr>
<td></td>
<td>(Range of Itaoumi)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sta. Barbara</td>
<td>City of Santa Barbara</td>
<td>756</td>
<td>Aroaera</td>
</tr>
<tr>
<td></td>
<td>Village of Coesa</td>
<td>762</td>
<td>V. Eschwege</td>
</tr>
<tr>
<td></td>
<td>The ironworks of Monlevade</td>
<td>781</td>
<td>Ditto</td>
</tr>
<tr>
<td>Itaoumi</td>
<td>Village of Santa Anna dos Forros</td>
<td>427</td>
<td>Aroaera</td>
</tr>
<tr>
<td></td>
<td>City of Itaoumi de Mate-de-toro</td>
<td>670</td>
<td>Ditto</td>
</tr>
<tr>
<td></td>
<td>The ironworks of Girau</td>
<td>860</td>
<td>V. Eschwege</td>
</tr>
<tr>
<td></td>
<td>Village of Barra do Bacalhão</td>
<td>697</td>
<td>Aroaera</td>
</tr>
<tr>
<td></td>
<td>Village of Barra do Anta</td>
<td>608</td>
<td>Ditto</td>
</tr>
<tr>
<td></td>
<td>Village of Santa Margarida</td>
<td>743</td>
<td>Ditto</td>
</tr>
<tr>
<td></td>
<td>Barracks of Santa Cruz</td>
<td>890</td>
<td>Ditto</td>
</tr>
<tr>
<td>Serro</td>
<td>City of Serro</td>
<td>940</td>
<td>V. Eschwege</td>
</tr>
<tr>
<td></td>
<td>Village of Milho Verde</td>
<td>1038</td>
<td>Ditto</td>
</tr>
</tbody>
</table>
TABLE OF THE ELEVATION OF ALL THE DIFFERENT POINTS IN THIS
PROVINCE ABOVE THE LEVEL OF THE SEA—continued.

<table>
<thead>
<tr>
<th>Municipality</th>
<th>Names of Places</th>
<th>The height in metres</th>
<th>Measurements taken by</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serro</td>
<td>Peak of Itambé</td>
<td>1316</td>
<td>Spix and Martins.</td>
</tr>
<tr>
<td>Diamantina</td>
<td>City of Diamantina</td>
<td>1132</td>
<td>V. Echeverge.</td>
</tr>
<tr>
<td>Montes Claros</td>
<td>City of Montes Claros</td>
<td>840</td>
<td>Spix and Martins.</td>
</tr>
<tr>
<td>S. Romão</td>
<td>Village of town of São Romão (level of the river of São Francisco)</td>
<td>498</td>
<td>Halford.</td>
</tr>
<tr>
<td></td>
<td>(ditto)</td>
<td>498</td>
<td>Ditto.</td>
</tr>
<tr>
<td>Januária</td>
<td>City of Januária (level of the river of São Francisco)</td>
<td>475</td>
<td>Halford.</td>
</tr>
<tr>
<td></td>
<td>Village of Morrinhas (ditto)</td>
<td>365</td>
<td>Ditto.</td>
</tr>
<tr>
<td>Guatucuri</td>
<td>Town of Guatucuri (up to the present village of the Barra or mouth of the River das Velhas)</td>
<td>329</td>
<td>Ditto.</td>
</tr>
<tr>
<td>Sabará</td>
<td>City of Sabará*</td>
<td>791</td>
<td>V. Echeverge.</td>
</tr>
<tr>
<td></td>
<td>(Village of Sante Antonio do Rio acima)</td>
<td>729</td>
<td>Lisais.</td>
</tr>
<tr>
<td></td>
<td>(Height of the mountain range of Peciada)</td>
<td>1783</td>
<td>Ditto.</td>
</tr>
<tr>
<td>Pitangui</td>
<td>City of Pitangui</td>
<td>619</td>
<td>V. Echeverge.</td>
</tr>
<tr>
<td></td>
<td>Village of Pompeu</td>
<td>336</td>
<td>Ditto.</td>
</tr>
<tr>
<td></td>
<td>Mouth of Pará</td>
<td>276</td>
<td>V. Echeverge.</td>
</tr>
<tr>
<td>Pará</td>
<td>Town of Pará</td>
<td>789</td>
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</tr>
<tr>
<td></td>
<td>Village of Matheus Lemos</td>
<td>734</td>
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<tr>
<td></td>
<td>Village of Bicas</td>
<td>943</td>
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<tr>
<td>Pouso Allegre</td>
<td>City of Pouso Allegre</td>
<td>805</td>
<td>Spix and Martins.</td>
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<tr>
<td>Jaguary</td>
<td>Town of Jaguary</td>
<td>813</td>
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<td>Village of Carne do Cumbuy</td>
<td>287</td>
<td>Ditto.</td>
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<tr>
<td>Camppanha</td>
<td>City of Camppanha</td>
<td>913</td>
<td>Ditto.</td>
</tr>
<tr>
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<td>(Village of the Pesa Corpoes do Rio Verde)</td>
<td>859</td>
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<td>Village of São Gonçalo</td>
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<td>Ditto.</td>
</tr>
<tr>
<td>S. João d'El Roy</td>
<td>City of S. João d'El Roy</td>
<td>394</td>
<td>Arocira.</td>
</tr>
<tr>
<td></td>
<td>Village of Ponte Nova (level of the Rio Grande)</td>
<td>914</td>
<td>V. Echeverge.</td>
</tr>
<tr>
<td>Oliveira</td>
<td>City of Oliveira</td>
<td>878</td>
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</tr>
<tr>
<td></td>
<td>Hill of Diamanté</td>
<td>1061</td>
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</tr>
<tr>
<td>Ayurúoca</td>
<td>Collector's office of Passa Vinte</td>
<td>354</td>
<td>Arocira.</td>
</tr>
<tr>
<td></td>
<td>(The top of the mountain range of Mina in the path of Passa Vinte)</td>
<td>557</td>
<td>Ditto.</td>
</tr>
<tr>
<td></td>
<td>(The top of the range of Quebra)</td>
<td>1278</td>
<td>Ditto.</td>
</tr>
<tr>
<td>Barcarena</td>
<td>City of Barcarena †</td>
<td>1676</td>
<td>V. Echeverge.</td>
</tr>
<tr>
<td></td>
<td>(Path on the height of Taipas)</td>
<td>1137</td>
<td>The author.</td>
</tr>
<tr>
<td></td>
<td>(Path on the top of the range of Manto Queira)</td>
<td>1288</td>
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</tr>
<tr>
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<td>Village of João Gomes</td>
<td>813</td>
<td>V. Echeverge.</td>
</tr>
</tbody>
</table>

* M. Lisais gives Sabará 695 metres above sea-level.
† M. Lisais makes Barcarena 1137 metres above sea-level.
TABLE OF THE ELEVATION OF ALL THE DIFFERENT POINTS IN THIS PROVINCE ABOVE THE LEVEL OF THE SEA—continued.

<table>
<thead>
<tr>
<th>Municipality.</th>
<th>Names of Places.</th>
<th>The height in metres.</th>
<th>Measurements taken by</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rio Preto</td>
<td>Town of Rio Preto (Bridge of Santa Clara on the River)</td>
<td>405</td>
<td>Apecira.</td>
</tr>
<tr>
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<td>(Bridge of Manoel Pereira)</td>
<td>437</td>
<td>Ditto.</td>
</tr>
<tr>
<td></td>
<td>Village of Santa Rita of Jacutinga</td>
<td>584</td>
<td>Ditto.</td>
</tr>
<tr>
<td></td>
<td>(The entrance of the Mine in the road of Manoel Pereira)</td>
<td>707</td>
<td>Ditto.</td>
</tr>
<tr>
<td></td>
<td>(ditto)</td>
<td>533</td>
<td>Ditto.</td>
</tr>
<tr>
<td></td>
<td>Village of Bom Jardim</td>
<td>921</td>
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<tr>
<td>Parahyba</td>
<td>City of Parahyba (level of the river)</td>
<td>621</td>
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<tr>
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<td>(River of the same name)</td>
<td>673</td>
<td>V. Eschwege.</td>
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<td></td>
<td>Village of Chapeo d'Uvas</td>
<td>396</td>
<td>The author.</td>
</tr>
<tr>
<td></td>
<td>Bridge of Parahyba (level of the river)</td>
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<td></td>
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<tr>
<td>Mar d'Espanha</td>
<td>City of Mar d'Espanha (parish church)</td>
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<td>Village of the Espirito Santo (the square)</td>
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<td>Path at the top of the range of Arribada</td>
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<td>(Port of Ericeira (level of the River Parahyba)</td>
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<tr>
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<td>Port of Piracema (ditto)</td>
<td>293</td>
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<td>Port of Chiador (level of the Parahyba)</td>
<td>293</td>
<td>Ditto.</td>
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<tr>
<td></td>
<td>Ditto (level of the intended railway of D. Pedro II)</td>
<td>371</td>
<td>Ditto.</td>
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<td>Mouth of the great river of Santo Antonio (ditto)</td>
<td>271</td>
<td>Ditto.</td>
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<td>Collector's office of Sao Pelelo (ditto)</td>
<td>297</td>
<td>Ditto.</td>
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<td>(Mouth of the river of Conceicao (ditto)</td>
<td>168</td>
<td>Ditto.</td>
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<td>Serodima</td>
<td>New port of Cunha (ditto)</td>
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<td>Village of Presidio</td>
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<tr>
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<td>Village of Santa Rita do Surro</td>
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</tr>
</tbody>
</table>

II.—HYDROGRAPHY.

The distribution of the Minas Province into the several hydrographic basins* of its seven great rivers is as follows:

* The channels of egress may be divided into two main lines, viz.:
1. Those flowing to the west with southing, as the Rio Grande (Pambrã).
2. Those flowing to the east with nothing, as the Rio de Sao Francisco, the Jequitinhonha, Doca, &c.
the Province of Minas Geraes.

The basin of the Rio de São Francisco contains ... 8,800
, , Grande (Paraná) , ... 4,900
, , Parahyba , ... 700
, , Itabapana , ... 80
, , Doco , ... 2,300
, , de S. Matheus , ... 100
, , Mucury , ... 400
, , Various streams falling into the sea between Porto Seguro and Porto Alegre* , ... 100
, , Rio Jequitinhonha contains , ... 2,200
, , Pardo , ... 400

Total ... ... ... ... 20,000

The two first-mentioned, by far the most important of all, are to the west of the Serra do Espinhaco: the five others are to the east of it. The Rio Grande, which is, perhaps, four times larger than the Parahyba, is on a much higher elevation: the difference of level between the valleys of the upper Rio Grande and the Rio des Montes (i.e., the head-waters of the Rio Grande) on one side of the Serra da Mantiqueira, and the basins of the Rivers Parahyba, Preto and Parahyba on the other, is between 500 and 600 metres.† The Rio Grande and São Francisco rising on both sides of the Serras da Canastra and de Piúmby, are almost in the same plane. On the other hand the Rio Paraopeba and the Rio das Velhas (i.e., the Upper S. Francisco) rising to the west of the Itacolumi range, are 200 metres above the Rio Doce, which drains eastward though its course and is full of rapids.


This stream rises in the Serra do Itatinho and the Municipality of Ayuruoca; after running about 20 leagues to the E.S.E. it shifts to the N.N.W. as far as its confluence with the Parahyba River. There it leaves Minas and takes the name of "Paraná." From its source to their junction are 130 direct and 205 indirect leagues. Its breadth at the Arraial do Livramento is 20 fathoms (brasas); † above the rapid of the Boaçava 150, and at the rapid of the Jangurá 354 brasas. It has several rapids, as da Boaçava, at the foot of the Piumby range; das Grinomos, 2 leagues above the junction of the River Santa; As Pedroso and the Rapid of the Jaugura, 3 leagues above the Porto da Radiana.

The principal tributaries, beginning from its source, are as follows:—
§ L. Rio Ayuruoca.
L. Rio Angahy.
R. Rio das Mortes, whose course is 36 leagues long, and its affluents are the River das Mortes Pequeno and the Carandahi.

* Such as the Rio Doce, the Parahyba, and insignificant streams which feed the Rio Itabapana, S. Matheus, and to others to the east.
† The valley of the Parahyba is a low oval, with higher grounds to west and north-west. It is about 600 feet below the Tietê, at S. Paulo.
‡ English inches 80:6162 = 7 feet 3 inches in round numbers.
§ R. shows that the feeder flows into the right, L into the left bank.
R. Rio Jacaré; course, 22 leagues.
R. Rio Lambary.
L. Rio Sapucahy Grande; course, 65 leagues; influents, the Sapucahy-Mirim, the Rivers Machado and Mozambó, and the Rio Verde.

The latter has a course of 44 leagues, and its feeder is the Rio de Baipendi, Lambary, and do Peixco.
R. Rio da Ucucuia.
R. Rio de S. Ignacio.
R. Rio Verde; course, 35 leagues.
L. Rio Sapucahy-Mirim, coming from the direction of S. Paulo.
L. Rio Moggyanusí, from same direction.
R. Rio Parumybys, which rivals the Rio Grande. It rises in the Serra da Mata da Córda, and falls into the former stream after a course of 145 leagues; influents, (R.) Rio de S. Marcos, 55 leagues; (L.) Rio dos Donadós; (L.) Rio das Velhas, 67 leagues; (R.) Rios Veríssimo, Cunhumbú, and da Maise Ponte, from the direction of Goias.

Besides these, the south-western corner of the Province contains the headwaters of the Jaguary, the Moggy, and the Jaguary-Mirim; tributaries of the Ticó and Tius of the Rio Grande.

II. Basin of the Rio de São Francisco.

This stream rises in the Serra da Canastra, at a rapid called A Casca d’Anta, which is said to be more than 1000 palms (palmas) in height. It flows almost directly south-southwest. At 97 leagues from its source and 6 above the junction of the Rio das Velhas, is the Rapid of the Pimpom, 5000 palms long, with 25 palms of difference in level between its extreme points. Here the stream is 2417 palms above sea-level, 5500 palms broad, 20 to 30 palms deep, and its discharge per second is 22,400 cubic palms. From this rapid to the junction of the Cunhambú, where it enters the Bahia Province, its course is 87 leagues, and important influents greatly increase its volume; though still 2056 palms above the sea, it is 3700 palms broad, with a depth extending to 40 palms, and its discharge 132,000 cubic palms per second. Beyond the limits of our province it runs 295 leagues till its mouth—in the first 155 to the Rapid of the Schindinho, where the current is never more than 4 palms per second. From the Villa da Boa Vista 29 leagues down stream to the Porto das Piranas, for a distance of 70 leagues the bed is full of rapids (encaixeirado). Of these the most important is that of Paulo Affonso, 365 palms of perpendicular height, and there are 1200 palms of difference between Boa Vista and As Piranas, which is still 42 leagues distant from the mouth of the river, and 82 palms above sea-level. The river has high banks, often ranging between 20 and 80 palms, yet the greater part of its valley is exposed to inundations and floods (enchentes), which have risen to 55 palms above the usual level.

The principal tributaries of the S. Francisco in the Mineiro Territory are:

L. Rio Bambui.
R. Rio Pará; course, 42 leagues; influents, Rio da Boa Vista, Rio Lambayés, &c.
R. Rio Parapeba; course, 68 leagues; influents unimportant.
L. Rio Indaiá; course, 38 leagues.
L. Rio Boraceia.

* This must not be confounded with the Northern Rio das Velhas.
† Each = English inch = 8.06162; in round numbers upwards of 8½ inches.
‡ This name frequently occurs; it is that of a common fish.
the Province of Minas Geraes.

L. Rio Abacatá; 20 leagues.
R. Rio das Velhas, anciently Guaiacuhy; course, 17 leagues, from its sources in the Serra de Antonio Pereira, to Sabará, and 155 leagues from that point to its debouchure; it is very tortuous, the total direct length being a little more than 60 leagues. At the mouth it is 743 palms broad, and the discharge is about 9000 cubic palms per second. The principal affluents are the Rivers Sipó, Paraíba, Pardo, Carinatuhy, and da Piedade.

R. Rio Jequitinhonha; course, 42 leagues; the mouth is 267 palms broad, and discharges 4600 palms.

L. Rio Paracatu, chief of the Mineiro tributaries, rising in the Serra dos Piões; course, 95 leagues to its junction, a little above which it is 820 palms broad, and discharges 60,000 palms into the São Francisco. Its principal affluents are the Rios Jacutinga, da Prata, das Lagos, da Praia (which measures nearly 80 leagues from the Lagoa Formosa to its junction), Catuca, and do Socorro.

L. Rio Uruçu: rises in the ramifications of the Pyrenees; course, 76 leagues; at its junction, 432 palms broad; discharges into the São Francisco 15,600 palms. Its affluents are the Rio Clará, 37 leagues long, and many smaller streams.

L. Rio Pardo; course, 65 leagues; breadth at junction, 188 palms; discharge, 5000 palms.

L. Rio do Peixe.
L. Río (stream) dos Pandeiros.
R. Río Mangaly.
L. Río Pirapáu.

R. Rio Verde Grande; source near the Montes Claros das Formigas; course, 120 leagues; breadth at junction, 230 palms. Its affluents are the Rios da Gerutuba, Pachay, Verde Pequeno, and others.

L. Río Canhinhana, rising in the branches of the Serra das Pyrenees; traverses the Serra do Paraná at the place called "Vião," thence to its junction, 70 leagues distant, it divides Bahia from Minas. It is 340 palms broad, one league above its debouchure, and it discharges into the São Francisco 7600 palms per second.

III. Basin of the Río Pardo.

The sources of this stream, in the Serra das Almas, at the extreme northeast of the Province, were, it is said, discovered in 1698 by Antonio Luiz do Passo, who, having collected a quantity of gold, dropped down stream to the sea. Its general direction is west-east; during a course of 80 leagues it collects some small streams, as the Rios Pecu, da Agua Fría, de S. João, and do Mosquito; then it leaves the Province, flows for 60 leagues more through Bahia, and falls into the sea in front of Canavieiras.

IV. Basin of the Río Jequitinhonha.

The sources are in the Serro Frío, 3 leagues west of the city of the same name; it first runs north, and then turns a little to the east. From its sources to the Salto Grande Rapid, in this province, the course is 140 leagues, and 24 leagues thence to its mouth near Belmonte. The above-mentioned rapid is about 200 palms high, and divides the river into the Upper and Lower Jequitinhonha; the latter section has also been called "Belmonto."

The principal tributaries are:

L. Río Itacambiranassú, rising in the Serra da Itacambira; course, 36 leagues.
L. Río Vacaria.

VOL. XLIV.
L. Rio das Salinas.
R. Rio Ararasuyh; rises in the Serra do Itambé, and during all its course—60 leagues, more or less—it runs almost parallel with the Jequitinhonha; during rains it is a considerable stream. Chief influent, (L.) Rio Preto, (L.) Siriema, (R.) Fanado, (R.) Setubal, (R.) Gravatá.
R. Rio Fianuy.
L. Rio Itinga.
R. Rio de João Grande.
L. Rio de S. Pedro.
R. Rio de S. Miguel.
L. Rio de S. Francisco.
R. Rio Piabunha.

V. Basin of the Rio Macuy.

The course of the Macuy is hardly 50 leagues from its source to the Rapid of Santa Clara, where it passes out of this Province into Bahia; from Santa Clara to its mouth, in Porto Alegre, are 30 leagues. Its principal influents to the Mineiro portion are:—
L. Rio das Americanas.
R. Rio Todos os Santos.
R. Rio de Urucuí.
L. Rio Parapan.

VI. Basin of the Rio de S. Matheus.

The sources are in the Serra Map-Map-Crak, and the course through this province is only 15 leagues.

VII. Basin of the Rio Doce.

This stream is formed by the confluence of the Rivers Pinoga and Gualacho. The first rises in the Serra da Mantiqueira, a little north of Barbacena, and flows to the north-east, receiving into its right bank the Rio Chupotó. To the junction of the Gualacho, the course is 34 leagues. The Gualacho is composed of two branches, a northern and a southern, the latter also called Rio Mainarte. After the junction with the Pinoga, the streams form the Cachoeira do Inferno, and from that point take the name "Rio Doce." It is full of rapids, denoting a considerable height above sea-level; according to Von Eschwege, the junction of the Gualacho is 341 metres (1560 palmas) high. The direction is first to north and a little north-east; after receiving the Sassauy Grande it makes a sharp bend, trending south-east as far as the Porto de Sonça, and thence east to its mouth. The course from the junction of the Gualacho to that of the Manhuáse (near the frontier of this Province) is 89 leagues, and thence to the debouchure 34. The principal rapids are:—
Cachoeira Fumaca, 5 leagues below the junction of the Pinoga.

... and breaks (correntezas, swift broken water) of the Baguaury, a little below the junction of the Rio Correntes.
Cachoeira da Figueira, 2 leagues below the junction of the Sassauy Pequeno.
Cachoeirinha.
Cachoeira do Reabojo do João Pinto and do Reabojo da Onga.
Cachoeira do "M."
... do Inferno or Cachoeirão.
... das Esacunhas (of the little ladders), the bed of the stream for 2444 fathoms (braças) forming stony ledges.

* So called from the shape of the windings.
† These little steps are the distinct strata down which the river tumbles.
The principal tributaries of the Rio Doce in the Mineiro part are:

- R. Rio de Ouro.
- R. Rio Matipó.
- R. Rio Pinheiral, rising in the Serra do Caraça; course, 40 leagues.
- R. Rio do Santo Antonio; rising in the Serra Frio; course, 44 leagues; affluents Rio do Peixe, Tumpe, and Guanhanus.
- L. Rio Correntos.
- L. Rio Sasaúhy Pequeno.
- L. Rio Sasaúhy Grande, rising in the Serra de Itambé; course, 50 leagues, collecting the Rios Vermeelho, Turvo, Jacurú, Caipóra, and others.
- R. Rio Cuiuté; course, 30 leagues.
- R. Rio Manhuacu; rises in the Serra do Brigadeiro; course, about 40 leagues.

The valleys of the Manhuacu, Tamuacurú, Urupucá, and a great part of the Sasaúhy and the Cuiuté, are little known, and still held by the Indigenos.

VIII. Basin of the Rio Itabapoana.

The sources are in the branches of the Serra de Brigadeiro; yet after a few leagues in this province, the stream passes into that of Espírito Santo and there falls into the sea: total course of forty leagues.

IX. Basin of the Rio Parahyba (do Sul).

This stream rises in the Serra da Bocaina, to the north of the city of Paraty (in Rio de Janeiro), and traverses for 50 leagues the north-eastern part of S. Paulo. It then re-enters Rio, and flows through the municipalities of Regente, Barra Mansa, Vassouras, Volta, and Parahyba do Sul. From “Tres Barras,” near the junction of the Parahyba with the embouchure of the Pirapitinga, a distance of 22 leagues, it divides Minas from Rio. Thence for 30 leagues it again runs through Rio and falls into the sea in front of the town (vila) of S. João da Barra. The bed is often full of rapids, with islands and islets of rock. At the “Tres Barras” it is 272 metres above sea-level, and in the Porto do Chiado 265 (M. Gerber). Von Eschwege was in error when he reduced this to 186 metres at the town of Parahyba. The chief rapids in the portion which bounds Minas are the Sapucia (above the suspension bridge)* and the Pombos, in an arm of the stream which passes south of an island of the same name. Between the “Tres Barras” and the junction of the River Pomba, the breadth varies from 450 palms to a quarter of a league and more. Usually the depth does not exceed 8 to 10 palms; inundations sometimes rise 25 palms above that level. The Mineiro tributaries of the Parahyba are:

- L. The Parahyba, rising in the Serra da Mantiqueira, south of Barbalha; course, 27 leagues. Its principal affluents are—(R.) Rio do Peixe, (R.) Rio Preto, which for 32 leagues from its sources in the south of the Serra do Itatiaia to its debouchure divides Minas from Rio, (L.) Rio Kágado.
- L. Rio Pirapitinga, rising in the Serra do Rio Pardo.

* I believe this to be the only suspension-bridge in Brazil (1865).
L. Río Murielé; it runs only 14 leagues through this Province; thence it passes into Río, and disembogues into the Parahyba, 30 leagues lower down and a little above the city of Campes.

X. Lakes.

They are not numerous; the principal are:

Lagoa Grande, in the Jaguary municipality; this lake drains both into the Río Moguacassú and the Río Sapucaí.

Various lakes are on the right bank of the Río São Francisco in the municipality of Santo Antonio do Monte; amongst them are the Lakes Fria and Verde, each with an area of one square league.

Lagoa Santa, in the municipality of Santa Luzia, 1 league in circumference; 8 leagues distant from it are the Seven Lakes, all smaller.

The Lakes of Santa Fé in the municipality of S. Roque, and to the north of the Serra de Santa Fé.

Various lakes are in the municipality of Grão Mogol, and which drain to the R. Jequitinhonha, as the Lakes das Pedras, dos Marrocos, dos Porcos, Formosa, de Sapé, da Vargem, &c.

Various lakes are on the left bank of the Río Doce, and near Santa Anna do Alién, amongst them the Nova, Verde, and da Barra.

The Lake da Agua Preta, on the banks of the R. Urupés, 2 leagues long, and little known.

<table>
<thead>
<tr>
<th>Name of the River</th>
<th>Name of places where the measurement was taken</th>
<th>Height in Metres</th>
<th>By whom taken</th>
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</thead>
<tbody>
<tr>
<td>Río Abaí</td>
<td>Mouth of the Río dos Tires</td>
<td>639</td>
<td>V. Eschwege.</td>
</tr>
<tr>
<td>R. de S. Francisco</td>
<td>Mouth of the Pari</td>
<td>579</td>
<td>Ditto.</td>
</tr>
<tr>
<td></td>
<td>Quelossa or Ri para the Pirapora</td>
<td>533</td>
<td>Halfeld.</td>
</tr>
<tr>
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<td>Mouth of the Río das Velhas</td>
<td>530</td>
<td>Ditto.</td>
</tr>
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<td>Mouth of the Panceiri</td>
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</tr>
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<td>Town of São Roque</td>
<td>488</td>
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<td>Mouth of the Urupés</td>
<td>483</td>
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<td>Mouth of the Río Pardo</td>
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<td>Mouth of the Mangueira</td>
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<td>City of Januaria</td>
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<td>Village of Morro dos</td>
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<td>Mouth of the Río Verde</td>
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<td>Mouth of the Carambola</td>
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<td>R. Doce</td>
<td>Mouth of the Bemlhão</td>
<td>607</td>
<td>V. Eschwege.</td>
</tr>
<tr>
<td>R. Parahyba</td>
<td>Mouth of the Guilacho</td>
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<tr>
<td></td>
<td>City of Parahyba</td>
<td>321</td>
<td>The author.</td>
</tr>
<tr>
<td></td>
<td>Bridge of the Parahyba</td>
<td>340</td>
<td>Ditto.</td>
</tr>
<tr>
<td></td>
<td>Port of the Erleda</td>
<td>339</td>
<td>Ditto.</td>
</tr>
<tr>
<td></td>
<td>Port of the Pracaema</td>
<td>273</td>
<td>Ditto.</td>
</tr>
<tr>
<td></td>
<td>Port of the Chinder</td>
<td>252</td>
<td>Ditto.</td>
</tr>
<tr>
<td>R. Grande</td>
<td>Village of Ponte Nova</td>
<td>394</td>
<td>V. Eschwege.</td>
</tr>
</tbody>
</table>

* M. Gerber little thinks what this statement of a “Lake with two Outlets” in these days means.
III.—Meteorology.

The annual mean temperature of Minas Geraes, according to its latitudinal position, should be about 23° of Celsius; the great elevation, however, reduces it in some places to 19°.*

Thus the mean annual temperature of Ouro Preto (1145 metres above sea-level), measured according to Bous ingault's system, is 19° 9' (Cent.). The Baron von Eschwege gives us the results of many years' observations at Ouro Preto, showing that the thermometer never rose above 25° 5' (Cent.) nor fell below 12° 2' (Cent.) during the hours when the sun was meridional, and the mean would be 18° 8'. The yearly mean temperature of Rio de Janeiro is 22° 5' (Cent.), and thus 1° (Cent.) = 440 metres in the mountainous parts of Central Minas.

Similarly Dr. Lund found the mean annual temperature of Lagoa Santa, near the Rio das Velhas, 20° 4' = 850 metres above the Atlantic.

These figures prove that a great part of the Province enjoys a pleasant and healthy climate, well fitted for the plants of the temperate and the tropical regions. The hottest parts are the lowlands about the great rivers, and travellers never forget the burning suns which received them when, descending from the high lands of Ouro Preto, Serro, or Diamantina, they reach the borders of the R. de São Francisco.

The year is divided into two seasons.† The winter, or dry season, lasts from April till the end of October, and the summer, or rainy season, occupies the other half. The downfalls, often accompanied by violent electrical discharges, are very heavy. Not unfrequently in January and February, uninterrupted wet weather lasts whole weeks. At other times rain is not continuous.

During the wet season the temperature rises, and reaches its maximum in the Veranico ("little summer"), a short rainless, hot season, which may be compared with the dog-days in Europe.‡ On the other hand, during winter severe frosts afflict the highland villages. In the Serra da Mantiqueira M. Gerber found pieces of ice 4 millimetres in thickness.§

Sufficient study has not yet been given to variation † and dip.

---

* South of Ouro Preto, and between S. lat. 22° and 23°, and in the higher parts of the Mantiqueira Range, Franklin Massena found the maximum temperature of summer + 21° (C.), of winter + 13°, and the general minimum + 6° (C).
† The "Indian" aborigines also divided the year into two seasons, viz., Courtney-era, sun-season, the "dias" of Tropical Africa and Alumina-era, rain-season, the "mansa."
‡ This fortnight of rainless heat usually occurs in Minas Geraes and São Paulo about the middle of January.
§ On the Italian snow falls and lies for ten to fifteen days.
†† M. Liais, at Sabara, in March, 1862, found the variation 1° 46' 31" west; at Pirapora (August 8th, 1862) 0° 0' 11" east. At the confluence of the Paranaiba (September 8th, 1862), 0° 56' 25".
At Ouro Preto early in 1861, the needle pointed 2° 35' w. Some forty years ago Von Eschwege found the inclination at Rio de Janeiro 28° 44' 30" s., with '20 oscillations per minute, and at Ouro Preto 29° 30' s., with 20½ oscillations per minute.

IV.—GEOLGY AND MINERALOGY.

The Province of Minas contains two geological regions; one primitive (underlying) and plutonic, the other transitional (primary, aqueous, or fossiliferous) extending over areas of vast dimensions.† The dividing line runs parallel with, and 50 to 70 leagues distant from, the coast. Between the systems are metamorphic formations resulting from their rival and reciprocal action. This zone of modification is 15 to 30 leagues broad; but it is everywhere broken and penetrated by its neighbours, and its superficial aspect is extraordinarily dilacerated. These metamorphic formations are interesting; they are the principal deposits of all the minerals, especially of the gold and precious stones, which lay the foundation of prosperity in the province.

I.—Primitive or Azoil (Underlying) Formations.


2. Quartzite (quartz-rock) and amphibolite (crystalline hornblende, the latter passing into syenite and diorite (syenitic greenstone of the trap family), but not in large quantities.

In different places the gneiss shows insertions of crystalline calcareous matter (marble), with a coarse granular texture. The quartzite or quartz-rock is easily decomposed, and is often found mixed with mica, even approximating to micaceous schist. The primitives are also cut by veins of feldspath, rock-crystal, mica, tourmaline or black schist, amphibol (hornblende), apatite (phosphate of lime and fluoride of calcium), and slate in places garnets (gemaudos) are abundant. The principal metals of this formation are gold, iron, and titanium (rutile and spheric).

II.—Metamorphic Formations.

1. Stratified gneiss, alternating with micaceous schist, and both much subject to decomposition.

2. Quartzite in smaller quantities.

3. Argillaceous talcose schist, or stio-schist with veins of the peculiar conglomerate called itacolumite (laminated talcose quartz), and siderocrite (crystallized iron P)§ the three preponderating over the first.

The itacolumite may be described as the skeleton of the mountains and its vast ramifications through the argillaceous schist often culminate in the highest peaks like the Serra do Itacolumi, which gave a name to the

* The primitive, of the days of Lehmann.
† In making this division, M. Gerber wholly neglects the volcanic formations, of which the Mantiqueira offers notable instances.
† At São João de Ri-Rei, Dr. Lee showed me a specimen of Amianthus from the neighbourhood.
§ Possibly sideroschistite, silicate of iron of fine black velvety colour.
the Province of Minas Geraes.

rock, and the Serras da Boa Morte, do Caraça, de Grão Mogol, da Mata da Corda, &c. All these formations contain marbles, limes or concretes. The following are the principal metals and minerals which exist in this matrix (corpo de formação), which still promise wealth and importance to the province.

**Gold.**—Its principal matrix is the siderocristos,* the hydrate of peroxide of iron (popularly called “Canga,”) arsenical iron pyrites, and veins of quartz and of rich crystal. The precious metal is also found in the detritus of these minerals, and consequently in the beds of all the streams which descend from mountains containing large deposits. Palladium, platina, and tellurium accompany gold in various places, and it is often found combined with platina, hence the name white gold (ouro branco).

**Iron.**—There are several formations, but especially olgist or specular iron, which covers large tracts of land. Such, for instance, are the deposits in the municipalities to the west and north of Ouro Preto de Grão Mogol; in the municipalities of Frei vídeo and others.

**Galena and Copper ore of various kinds are found in the municipalities of Indaiá, Pitangui, Santa Luzia, and Mariana; the lead is argentiferous.** There are also deposits of manganese, bismuth, titanium, arsenic, mercury, cobalt, strontian, &c., but these have been little explored.

**Sectile† and Bgate exist in the municipalities of Ouro Preto and Mariana; asbestos in that of Pomba; kaolins and refractory clays in those of Mariana, Caeté, Ubá, and others.**

Amongst the precious stones deserve mention, topazes and enaite (also found in Peru), in the municipality of Ouro Preto; chrysoleites and agua marinhas (the blue-green beryl) in Minas Novas and Grão Mogol; amethysts and garnets in Mariana and Pombal, and especially diamonds. The virginal matrix of this stone is considered to be the itacolomite formation. Thence it has been washed by secondary revolutions into the beds of streams which flow from mountains of that sandstone; for instance, the Rivers Jequitinhonha and Pardo, which rise in the Serras of Itambé and Grão Mogol, and the various streams pouring from the Mata da Corda to water the municipalities of Ubá, Bagagem, and Patrocínio.

III.—Transitional Formations.

To this division, whose principal representative is the traumatic schist, belongs the greater part of the country to the north-west of Minas; the sparsely inhabited lands (sertões) about the São Francisco and the borders of the River das Velhas, as far as the Lagoa Santa. The strata are almost wholly disposed on horizontal bases, and in many places they contain veins of limestone, spherical in shape, and horizontally stratified. These rise at times to a great elevation, and contain large caverns. Spix and Martinus discovered near the city of Montes Claros, amongst others, one called the Lapa Grande (Big Cave), which was 200 paces high, and of considerable extent. In the vicinity of Lagoa Santa, Dr. Lund, and others have penetrated into more than a thousand.

These caverns have yielded up numerous remains of extinct animals, buried in a nitrous clay, and infiltrated with ferruginous particles, which

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* Here the word means “Jacutinga,” protodoxe of iron with beds of manganese and sandy titanium; it is the common “Mineral de fer” in the province.
† Sometimes called Pedra Sabio, our scopstone; it is pearl grey or green-blue, and tints remarkably well. The latter colour is also known as Pedra Arumada.
‡ Messrs. Lund, Clausen, and other palaeontologists have described as many as 115 species of mammifers alone, almost all distinct from the animals now inhabiting the country.
gave them great weight and a metallic lustre, imitating bronze. They are chiefly of the Pliocene period, and belong to the Edeonata (Glyptodontes, giants, corresponding with the modern tapirs or armadillos), the Megatheridae and the Mylodontes, huge terrestrial prequins, or sloths, while the terrible Smilodon populator (L.), which approximates to the Felidae, exceeds the lion in size, equals the bear in robustness, and has claws 9 inches long. Mixed with these, though rarely, are true anthropithes, or fossilized human bones, and this gives to the discovery its highest value.*

In some elevated spots of the Serra da Porteira,† Dr. Virgilius von Heimreichen reports that he found, superimposed upon the traumatics schists, the Devonian or Old Red Sandstone (Felho gres ermelho). It does not, however, appear that the carboniferous system which should immediately follow above the latter has been discovered.‡

IV.—Mineral Fountains.

Of these some are thermal, as the Sulphur Springs of Caldas, and the “Aguas Virtuosas” (Beneficent Springs) of Campanha and Lamby, which are also gaseous; the fountain of Cachumbú in the municipality of Beipendy; the “Aguas Santa” (Holy Water) of the Serra of S. José e El-Rei, and various chalybeate fountains in many parts of the province, as the thermal waters of the city of Itabira.

The conclusion drawn by geologists from the exploration of Minas is, that the Braziis generally, and this province especially, has the honour of being the most ancient continent of our planet.§ It existed when the rest of the world was either submerged by the ocean, or arose from the surface of the sea in insignificant peaks and islands.

M. Elie de Beaumont has shown that the age of the several continents, that is to say, the period of their emergence, preceded in the most immemorial formations with horizontal beds, and succeeded in those whose strata were broken and inclined by secular elevation. Here the transitional deposits are horizontally stratified, and show no superimposed secondaries or tertiaries—a phenomenon unknown to any part of the so-called Old World.¶

V.—Flora.

The province shows three distinct zones of vegetation, viz.:

1. The wooded zone (zona do matto).
2. The prairies (do campo).
3. The Alpine zone.

The great Espinhago chine separates the wooded region of
6000 square leagues to the south and east, from the compass to

* I need hardly say that the fossil man has not yet been generally acknowledged.
† At the Porteira I found the sandstone much younger than the New Red, which in the Brazil mostly underlies the true carboniferous deposits.
‡ The South American coal-field does not yet appear in our popular books; the South African shows its fade. In Minas Gerais I saw nothing but aspahlic, cannel coal and quartzary lignite.
§ The continent between the Rio Plata and the Straits of Magellan is a modern upheaval of an ancient floor, 1200 to 1400 miles in length, by nearly 400 miles in breadth.
¶ Another conclusion to this effect will be found in the article treating of the comparative anthropology of the primitive inhabitants.
the north. The latter, with the Alpine region, which is 1100 metres above sea-level, cover an area of 14,000 square leagues.

The first is most luxuriant in the riverine low lands, where humidity of soil and atmosphere are excessive. As usual in the Brazilian jungles the trunks are tall and thin, whilst the foliage is confined to the summit, and is not thickly-spreading.

An astonishing variety of trees and plants compose the Brazilian "bush." The largest trees are all dicotyledons belonging to the families Urticaceae, Euphorbiaceae, Lauraceae, Leguminosae, and Myrtaceae; the latter two, combined with the palms, compose the undergrowth. An infinity of Lianas (Sipile) and climbing-plants, belonging chiefly to the Bignoniaceae, Leguminosae, and Aroides, pass like cordage from tree to tree. Many families of parasites and air-plants, especially Aroids, Convolvulaceae, Bromeliads, and Orchids, some of them with magnificent flower-bunches, spring from the trunks and boughs. The ground is veiled with Passiflorae, Lichens, Aspalthe, Gramineae, and Liliaceae, which are frequently 30 palms high.

The principal building timbers of this zone are:
- Ipê (Tecoma speciosa, Mart., or Bignonia longiflora).
- Braúna or Guanána (Melocotonon Braúna).
- Jacarandá (rose-woods), of various kinds (J. Pecera, J. suberbang, J. ceiophylla, Mart.).
- Canella, black and brown (Metandra, Mart.).
- Sapucu (Logothis Ollaria, St. Hil., and L. grandiflora, Mart.).
- Peroba or Paroba.
- Cedro (Cedrela Brasilensias, St. Hil.).
- Lenro.
- Massaranduba.
- Sasaíma (Laurus Sassafras); and others.

The heads of the Palm family are:
- Macaúba (Acrocomia selerocarpa, Mart.).
- Lencur (Cerox capitate).
- Beijanba (Astrocaryum Apere).
- Tucum (Astrocaryum Tucum, Mart.).
- Palmito (Cerox americana).
- Indaiá (Attalea compacta, Mart.).

Other characteristic forms of the forest zone are:
- Sasaíma commune (Pteris audata, the common fern).
- Sasaíma gigantea (Polyglossum, the tree or arborescent fern).
- Umbu de Umbu (Cecropia palmata and peltata, Mart.).
- Taquára (Bambusa Teyuara, Mart., the Brazilian bamboo), and
- Captim Goedeva.

Compared with the forest growth that of the Campos is stunted and mesquino. The soil is covered with different Gramineous plants, that seldom exceed 4 palms in height. They are principally Echinochloa cabrera var. ciliata, St. Hil., mixed with Paniicum campesire, Mart., some Apocynaceae, Malvaceae, and others.

Trees are confined to the beds of streams, and they form mattos or islets
called "Capão." They are composed of stunted forms called "Catingas," and "Carrascos," according to the height. The prairie with scattered shrubs and stunted trees is called Campo Serrado (cerrado) to distinguish it from the grassy plain (campo ruivo). The characteristic trees of the Campo are—

- Pinheiro (Arraucaria brasiliana).
- Palmito do Campo (Cocos flexuosa).
- Burity (Mauritia flexuosa, St. Hill.).
- Pequi and Camellottas (Pequi doctoria, Mart.).
- Umbu (Cereopsis).
- Solanaceae (especially the S. Lycopersicum of St. Hilare, which produces the fruta do lobo, a thorny plant, 8 feet high).
- Sensitives (especially Minna ducretorum, St. Hil.)
- Barrigudo (Citrus ventricosa, Mart.)

And sundry hard timbers for building, e.g.—

- Aroeira (Schinus terebinthifolius).
- Jacarandá do Campo.
- Camarão (Lantana Camara, Mart.).
- Candia (Lycichnopora, Mart.), chandelier plant.
- Balsa (Myrsinaquum, Mart., and Monarda basilca). There are also many members of the families Fournroya and Agave (locally called "Pita"), sundry pineapples, especially the Ananas do Campo (Bromelia bracteata), and sundry species of Cassia, Zephrasia, Malvaceae, and Arecinos (Lantana microphylla, Mart.).

The third, or Alpine zone of the Brazil, exceeding 1000 metres, resembles the Campos, but it is more indigent in vegetation. The small hill-growths and the second growths of wood (encimetas and cacaoera) are almost entirely absent. A few stunted Euphorbias, Illicium, and Verbeneas, flourish, with lichens. The most characteristic plants of this region are the Liliaceae, Barbacane, Vellozias, and especially a kind of Pandanus, or screw-pine, locally called Canella de Êma (strick's shank).

The cultivation is chiefly represented by maize, rice, beans (Unanos derasus, Mart., vulg. feijoo); sweet potatoes (Batatas) of many sorts, the Inahome (Yam, Arum esculentum of St. Hil.), Mandiocca (Manio, Maniopa Manhöt, Linn.), coffee, tobacco, sugar-cane, cotton (G. vitifolia), arrowroot (Arracá Pissirao Indico), indigo, and a variety of Leguminosae. The fruits are represented by the orange (Citrus Aurantium and C. Efferata); the lime (Citrus limonum and C. medica), the banana (Musa sapientum and M. paradisiaca), the papaw (Carissa Papaya, vulg. Mamoeiro), the peach, the Jaboticabeira (Eugenia caudiflora), the Pitanga (Eugenia uniflora or Pitanga), the guava, the mango, the pineapple, and the Palmas-Christ (Pitius commandas, vulg. Manioma).*

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* Capo in the singular means an island, and the comparison suggests itself to every eye. Catinga means a fetor, especially of a negro, it should be written Catinga, meaning "white leaf." The small deciduous growth is so called because the virgin forest looks much darker. "Carrasco" is a low bush, a dummus 8 to 4 feet high, growing on elevated tracts. These words are well explained in Gardner's Travels.

† The older writers, like Henderson, assert, as regards the phytology of the province, that the soil produces well during the first year, little in the second, and almost nothing in the third. Equally it requires manure.

‡ The savages used to bury the unripe bananas in the sand, and then expose it to the sun; the effect was a pleasant fermentation. The Peruvians distil from it an unwelcome and unsavory rum.

§ Amongst other articles we may mention copaiva and other balsams, Peru, the monardina, &c., ipecacuanha, jalap, vanilla, the urucu and other dyes, many kinds
VI.—FAUNA.

The list of animals is not less extensive than that of plants. In the class of insects and articulata, a magnificent entomological collection might be made, embracing all between the beautiful atlas, poising itself in the forest shade, and the scorpion lurking in the wall; between the pernicious saiva (or saíba ant)* to the valuable bee and the silkworm.

Amongst the vertebrata we may find space to mention the—

Guanco (*Felix occa*, Linn.).
Sequarana (*F. confector*, Linn.).
Guará (*Canis caniceps*, Neuw.).
Brazilian fox (*Canis aureus*, Neuw.).
Quati (*Neosus solitarius*).
Sloth (*Bradypus*, Linn.).
Tatu (*Dasyopus*, Linn.), the armadillo.
Anteater (*Myrmecophaga*, vulg. Tamanduá).
Paca (*Cavia pacu*, Linn.).
Anta or Tapir (*T. americana*, Linn.).
Martianco (*Mephitus fœcund*, Linn.), the Brazilian skunk.
Capybara (*Hydrochoerus Capibara*).

Amongst the reptiles we may note:—

Jacuí (the Cayman, *C. scherops*).
Giboya.
Sucrejú (*Boa Anaconda*), boa constrictor.
Surucuá (*Crotalus matur*).
Jararaca (*Trigunophis jararac*).

And the blacksmith frog (*Lydia palmata*, vulg. Ferreiro) is very common.

The principal fishes are:—

Piranhas (gen. Serru Salmo), a fish 1 to 2 feet long.
Pilamis.
Surebba (*Pimeleodes Tigrinus*).
Dourados.
Trahiras, and many others.

Amongst the multitude of birds we can only name, the Emu (*Struthio or Rheus Americanus*), Siri munna (*Dichophema crista*, Engraves), a serpent-eating bird; Tabiri (Mysticetes Americanos), somewhat resembling the “adjudant-bird” of India; Spoonbill (*Platalea Ayguav*, vulg. Colherena); Parrots and Macaws (*Arara*); Toucan (*Rhynchostus*, vulg. Ticano, from its cry); Heron (*Ardus*, vulg. Arão); Vulture (*Cathartes Textens*, vulg. Urubú); Serrana (*Cathartes Orjenesia*), delicious eating; Codorna, the common Brazilian “partridge” (*Trichurus brevispic*, Pohl); Capoeira (*Perdiz dentata*); Saiba (*Tarius*), the local nightingale; humming-birds or Colibri (*Trochilus*, vulg. Beijaíor).

*Ecolima cephalotes. Mr. Bates has published an illustration of this destructive animal (‘Naturalist on the River Amazonas,’ title-page, vol. i.).
VII.—COMMERCE AND LINES OF COMMUNICATION.*

Commerce in Minas has hitherto been little developed, on account of the depression of the people and the expense of transport. As in most of the Brazilian interiors, the roads—that test of civilization—are painfully neglected, and the best are fit only for mules. The first step towards improvement will be the Pedro Segundo Railway, a main branch with feeding branches adapted to wheeled vehicles: communication, once thrown open, the active and energetic people will wonder how they and their forefathers ever existed without it. At present, with the exception of the 7½ leagues of the “União e Indústria” road, there is none that can be passed over except by a litter, or by the rude and heavy ox-carts, which hardly ever cover 10 miles in the 24 hours. The expense of transport limits exportation to the Southern Municipalities, where there are lines radiating from the Capital. The central regions cannot send out their produce, and of late years trade with S. Paulo, Goyaz, and Bahia, has greatly fallen off. The internal commerce is limited to the transporting of alimentitious substances for short distances: the import is represented by woven stuffs, spirituous drinks, native and European produce of different kinds. The imports have increased so greatly that they now nearly balance the exports.

The present communications may now be examined.

I. Communications with the D. Pedro Segundo Railway.

This railway, in 1861, was opened between the Capital and Belém, a distance of 10 leagues (40 miles). In 1867 it was progressed as far as the station of Entre-Rios, on the Parahyba River. The following tables show its progress. In 1861 there were—

279,380 travellers,
75,069 arrobas of travellers’ luggage,
3,696,255 , various merchandise,
408,389 cubic palms of material, &c.,
381,313 long palms of timber, &c.,

with a total revenue of $130,688,984 (= 112,000£).†

The line is expected to divide at the Barra do Piriápolis into two branches.
The western runs up the Valley of the Parahyba River as far as the Porto da Cachoeira (the Great Rapé), a little below Lorena, in the Province of S. Paulo. From the terminals boat-navigation can easily be extended into the heart of the S. Paulo province, which will soon see its north-eastern corner commercially attached to Rio de Janeiro.

The eastern branch will run down the Southern Parahyba River, as far as the Porto Novo da Conha. This line subtending the frontiers of Rio de

* As yet the province has no railway, and the transport is effected by a few carts and some 20,000 to 30,000 pack-mules, each carrying six to eight arrobas.
† The following is a synopsis of the working till June, 1866.

D. Pedro II. Railway.—The passenger traffic from April, 1868, to June, 1869, was as follows:
Janeiro and Minas, will be especially useful to the latter, if properly supplied
with feeders. It will further be referred to in the following article.

From the western branch it is proposed to connect the Capital with the
Valleys of the Rio Grande and the Sapuacy. The Rio Grande line will fork
at a point between the Barra do Pirahy and the village dos Remedios; it will
traverse the Valley of the Rio Preto and the Great Mantiqueira Range, and
follow down the waters of the Rio Grande till they become navigable. This
line may also be connected with the S. Francisco River by two branches, one
passing S. Joao d'El-llei till it reaches the basin of the Pará affluent; the
other crossing the plateau of Piumhy to the east of the Serra de Canastra,
where it strikes the head-waters of the chief stream.
The connection with the Sapuacy River, which is navigable from the Barra
do Santo Antonio to the Cachoeira a little above its mouth, will be effected
at a suitable point between Legenda and the Cachoeira or Rapids of the
Parahyba.

II. The "União e Indústria" Road.

This road was undertaken by a company with a capital of 180,000£. The

| 1st half-year of 1888 | ... | ... | ... | ... | ... | 20,841 |
| 2nd ... | 1888 | ... | ... | ... | ... | 85,247 |
| 1st ... | 1889 | ... | ... | ... | ... | 78,252 |
| 2nd ... | 1889 | ... | ... | ... | ... | 109,382 1/2 |
| 1st ... | 1889 | ... | ... | ... | ... | 112,232 |
| 2nd ... | 1890 | ... | ... | ... | ... | 122,480 |
| 1st ... | 1890 | ... | ... | ... | ... | 95,863 |
| 2nd ... | 1891 | ... | ... | ... | ... | 153,497 1/2 |
| 1st ... | 1892 | ... | ... | ... | ... | 130,781 |
| 2nd ... | 1893 | ... | ... | ... | ... | 159,504 |
| 1st ... | 1893 | ... | ... | ... | ... | 141,414 |
| 2nd ... | 1893 | ... | ... | ... | ... | 163,442 |
| 1st ... | 1894 | ... | ... | ... | ... | 171,973 |
| 2nd ... | 1894 | ... | ... | ... | ... | 181,725 |
| 1st ... | 1895 | ... | ... | ... | ... | 179,830 |
| 2nd ... | 1895 | ... | ... | ... | ... | 192,860 1/2 |
| 1st ... | 1896 | ... | ... | ... | ... | 200,432 |

Total Number ... ... 2,350,910 1/2

The cost of working to revenue, and relative percentage of the working expenses
to the whole traffic receipts were as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Income</th>
<th>Working Expenses</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1889</td>
<td>600,000</td>
<td>570,400</td>
<td>61%</td>
</tr>
<tr>
<td>1890</td>
<td>911,402</td>
<td>672,900</td>
<td>74%</td>
</tr>
<tr>
<td>1891</td>
<td>1,088,458</td>
<td>843,500</td>
<td>77%</td>
</tr>
<tr>
<td>1892</td>
<td>1,000,221</td>
<td>864,982</td>
<td>86%</td>
</tr>
<tr>
<td>1893</td>
<td>1,169,571</td>
<td>993,342</td>
<td>84%</td>
</tr>
<tr>
<td>1894</td>
<td>1,296,300</td>
<td>1,211,205</td>
<td>94%</td>
</tr>
<tr>
<td>1895</td>
<td>1,588,594</td>
<td>1,755,820</td>
<td>85%</td>
</tr>
<tr>
<td>1896</td>
<td>1,600,521</td>
<td>1,818,750</td>
<td>88%</td>
</tr>
</tbody>
</table>

Revenue of 1890:
- Passages: 481,274
- Freight: 371,078
- Telegraph: 422,960
- Warehouse: 1,002,460
- Fines: 427,357

Net revenue of 1890: 1,610,231

Length of line, including the Macacos branch, 174 2 kilometres.
section between Petropolis and the city of Parahyuna, the ancient Juiz de Fora, was opened June 24, 1861. Of this there are 750 leagues (221 miles) in the Province of Minas, beginning from the接收ship of the Parahyuna River, ending at the city of Parahyuna (the ancient Juiz de Fora). It is at present the principal artery flowing to the capital. This is doubtless the best road now existing in the Brazil; though the country is broken, the slopes do not exceed 3 feet per hundred, and transport is effected by four-wheeled cars, carrying on an average 500 arrobas. For passengers there are stage coaches of English build; the fare is $0.00 ($ 2c.) per league, and $0.050 ($ 1d.) per arroba, including the barrier taxes (pike, &c.). They run the distance in nine hours, at the rate of 24 leagues per hour.

From this Minas branch it is intended that many feeding lines shall be pushed into the interior. The principal are:

(a.) Between the Forno de Cal station and the Municipalities of Mar de Hespanha and Leopoldina, rich in coffee.

(b.) From the Juiz de Fora station, passing through the Municipalities of Mar de Hespanha and Pomba, crossing the Serra da Caramona and reaching the Rio Doce.

(c.) A northern prolongation of the road through the city of Barbacena to the Valleys of the Rivers das Mortes, Paraopeba, and das Velhas. The old road which still unmarked connected Parahyuna and Barbacena, was repaired in 1860, and the last mile or so, near Barbacena, passed over a new line of macadamized highway.

At present (1867) the D. Pedro Segundo Railway is "running into" this line. Its future, therefore, is still doubtful.

In the forty-five months between April 1, 1858, and June 24, 1861, the traffic and passengers from Petropolis to Pedro de Rio, and the total receipts on the road between Petropolis and Juiz de Fora till the end of 1861 stood as follows:

<table>
<thead>
<tr>
<th>Months</th>
<th>Merchandise in Arrobas</th>
<th>Passengers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Export</td>
<td>Import</td>
</tr>
<tr>
<td>From 1st April to 31st Dec. 1858</td>
<td>500,878</td>
<td>236,669</td>
</tr>
<tr>
<td>From 1st Jan. to 31st Dec. 1859</td>
<td>1,100,401</td>
<td>419,004</td>
</tr>
<tr>
<td>From 1st Jan. to 31st Dec. 1860</td>
<td>1,370,416</td>
<td>464,282</td>
</tr>
<tr>
<td>From 1st Jan. to 31st Dec. 1861</td>
<td>1,500,101</td>
<td>527,232</td>
</tr>
<tr>
<td>Total</td>
<td>4,776,800</td>
<td>1,577,187</td>
</tr>
</tbody>
</table>

In the above-mentioned period of 45 months the
profit on portage of goods | ... | ... | Rs. 2,211,803 | $046 |
Expenses of such transit | ... | ... | 1,680,916 | $532 |
| Balance | ... | ... | Rs. 524,886 | $304 |
The produce of passengers by diligence | Rs. 239,727 | $130 |
Expenses of such transit | ... | ... | 178,234 | $106 |
| Balance | ... | ... | Rs. 61,492 | $724 |

* It is intended to consist of three great sections:

1. From Petropolis to Juiz de Fora, 28 leagues, with 11 stations and 12 bridges, of which five are of wood and seven of iron.
III. Navigation of the Parahyba River below S. Fidelis.

The south-east of the province, in 1863, was connected by steam navigation with the littoral by vessels running between the Port of S. Fidelis, the city of Carajas and S. João da Barra. It is also proposed to make a second from S. Fidelis, up the Valley of the Rio Pomba, which would connect with the branch lines to the east of the "União de Indústria" highway, and ultimately strike the Rio Doce. This must give considerable impulse to the municipalities of Leopoldina, Pomba, Ubá, and Muriaé. The charges between S. Fidelis and Rio de Janeiro range between 1$240 and 0$400 per arroba.

IV. Communications with the Rivers Itabapuna and Itapemirim.

The Itabapuna is navigable from its mouth to the great Cachoeira (rapid), 10 leagues up the bed. As early as 1852, it was proposed to connect this point with the municipality of Mariana by means of a tramway with wooden rails. The Itapemirim gives free passage from the village of Cachoeira to the mouth. Such a line of communication, by means of the riverine valleys would greatly benefit the municipalities of Mariana and Ponte Nova, and passing through a rich country, would expeditiously open up the virgin forests of Manhuaçu and Carangola. The project was revived in 1863.

V. Communication by the Rio Doce Line.*

This stream, which traverses the most magnificent forests that still remain in the province, is unfortunately not navigable, except below the "Serra de Minas" Rapid, in the province of Espírito Santo, a little above the Porto de Souza, and the navigable part is difficult and dangerous. As is the case with almost all Brazilian streams, the bed of the Rio Doce is encumbered with large

2. From Juiz de Fora to Barbacena, 13 leagues, not marshed; there is no coach during the rainy season.
3. From Barbacena to Ourol Preto, the provincial capital, 22 leagues. Impassable for coaches throughout the year.

The Company receives, for carrying the mail-bags, 3200£ per annum.

* About this stream is still found the finest scenery. The soil is excellent for rice in the lowlands; the uplands produce corn and sugar-cane, 3 inches in diameter, and here it flowers, whereas it does not in the Southern States of the American Union. The fruits are better than those of Rio de Janeiro, gold and diamonds are also found in the bed. The thermometer (F) ranges from 63° to 90° in the shade.

Like the S. Francisco, the Rio Doce has shifted to the north between its mouth and Linhares. The bar is bad, streams pass over it only at high water and about full moon. The mouth is about 5 miles broad and narrows to 1 mile opposite Linhares, a townlet of 200 to 300 souls, 80 miles from the embouchure. Here it is full of fish, especially the Tairá, the Tamba, and the sword-fish,—the latter attaining a weight of 200 lbs. The depth of water is said to be 9 feet, which may be reduced to 5. At Guandú, 90 miles up, the stream breaks through the marble range and forms a great rapid.

A Southern French, Mr. Guter, lately established a colony which cleared some 300 acres, chiefly on the Juqueira Lake. This water, which is not laid down by Mr. Keith Johnston, is about 20 miles long by 1 to 8 broad. Dr. Johnston, who sounded about a fourth of it in a diagonal line, gave it an average depth of 33 feet. It has a Ponte de Ouro, showing where gold was once washed. The colonists, who were about 160 souls, suffered much from chills, fevers and droughts; but even more from want of communication. According to my informant, Dr. Dunn, of Ala, many left because they could not get a line of road opened between Linhares and S. Mathias, a distance of some 60 miles.
sandbanks, expensive to remove. Above the Porto de Souza there are violent currents and many rapids; the people, however, ply canoes carrying 200 to 350 arrobas. From the Porto de Souza roads would pass through the virgin lands and rich riverine valleys of the Upper Rio Doce, Manhuassá, Ciné, S passhy, and Santo Antonio, and would open up the municipalities north of Minas, as those of Itabira, Conceição, and even of Serro do Diamantina.

The General Assembly of 1835–36 authorized an Anglo-Brazilian line to establish steamers on this stream. About August, 1838, a company was formed in London by Mr. John James Sturz, and charters were granted enabling it to monopolize the steam navigation. The first vessel was put upon it in 1841. Many difficulties, however, were found, and the project was dropped. The Indians here were never very dangerous, and as early as 1838 a tribunal was established at Ouro Preto, calling itself “Junta de Os Conquistas and Civilisation of the Indians and Navigation of the Rio Doce.”

VI. Communications by the Valleys of the S. Mathaes and Mucury Rivers.

The steamers of the Rio de Janeiro line have ascended the S. Mathaes from the mouth to the city of that name. The continuation of its valley offers a good connecting line with the adjacent parts of Minas, that is, the waters of the Tambaçury River. Nothing, however, was done but to open a path (picaça) in the direction of Santa Clara. About ten years ago new lines were begun to connect the valley with that of the Mucury, a few leagues to the north of the S. Mathaes.

The Mucury is navigable for the 30 leagues between its mouth and the Rapid of Santa Clara. The Mucury Company put on steamers and made a road of 27 leagues from Santa Clara to the Valley of Todos os Santos, where it founded the important village of Philadelphia. This line, which carried off a considerable portion of the traffic of Minas Novas and Grão Mogol, was macadamized only in certain parts; its slopes never exceed five per cent, and four-wheeled carts travel over it. A provincial road, 14 leagues long, was also opened from Philadelphia to the Alto dos Bons; if improved and prolonged with feeders to the waters of the Jequitiinhonha, it would be the main commercial artery for the north of Minas.

VII. Communication by the Riverine Valleys of the Jequitiinhonha and the Rio Pardo.

The former stream is navigable from parallel of Mombana to its mouth. There is, however, an interruption of 19 leagues between the Isle das Fanchas and the Cachoeirinha, 12 leagues above Belmonte. This part of the stream is full of rapids, the greatest being the Salto Grande (Great Fall), which forms the frontier line of the Bahian province. There is also an extraordinary want of water during the dry season in this stream, which at other times is large and well-filled. The navigation of the lower river would develop the municipalities of Ararasahy and Rio Pardo; but the Mucury would be a preferable line for Minas Novas, Grão Mogol, Diamantina, and Montes Claros. The canoes on the upper channel can carry 55 alqueires of salt.

The Municipal Chamber declares that the Rio Pardo is navigable from its mouth to the Salto da Verruga, which can easily be removed. Thence to the town which took its name from the stream, a distance of 30 leagues, canoes only are used. It is asserted that a small outlay would open the river to regular navigation.

* I fear that this statement must be taken with many a grain.
The German engineer, F. Halfeld, employed by the Imperial Government, proved that this fine stream can be navigated on a large scale from the Rapid of Pirapora, 5 leagues above the mouth of the Rio das Velhas, to the broken water of the Sobradinho in the Bahian province—a distance of 239 leagues. As 87 of these are in Minas Geraes, this fluvial highway is obviously the most important communication of the northern municipalities. A noble line of communication through the heart of Minas would be opened by connecting the termini of navigation with the Don Pedro Segundo Railway and the “União e Indústria” road at the head, and at the mouth with the Bahian and the Paraná-Rio Squares. Here the great centre would be the town of Jaqueiro, 18 leagues below the Sobradinho.

The craft at present on the S. Francisco may be described as—

1st. Canoes, about 100 by 5 palms.
2nd. Rafts or linked boats, of sizes.
3rd. Barques (barcaza), from 60 to 150 palms long by 12 to 16 of beam, and drawing when laden a maximum of 6 palms; some carry 1,600 arrobas. The bed has many sandbanks (sandrus), but they are easily removed, and they do not prevent regular navigation. The Councillor M. P. de S. Dantas, in 1866, President of the Bahian Province, ordered a steamer to be put together at Jaqueiro, and launched upon the upper waters.

This grand artery of communication is supplied by many feeders, some fluvial, others land routes; the principal are—

(a) The Upper S. Francisco. There is canco navigation from the parallel of Bambuí, down stream. From the mouth of the Pará up the bed the river is almost too small for extended navigation, but this point will be settled by the minute surveys of the Imperial Government. The valley affords place for a road, 72 leagues long, from the Rapids of Pirapora upwards; it would pass near Pinhão or Formiga, and hence strike the Rio Grande at some navigable point.

(b) The Pará Valley. From the last-mentioned road a branch might accompany the Pará River, and passing through the city of Pintâgu, connect with the road coming from S. João d’El-Rei. This stream is also ploughed by canoes from its confluence with the S. Francisco to the Bridge of “the Miranda,” three-quarters of a league from Pintâgu. It remains to be seen if larger craft can be put upon it.

(c) The Paranoá Valley. Canoes ply on the river for 22 leagues above the mouth; larger vessels have been hindered by the Rapid do Chôro, and it is not known whether they can be removed. If not, a branch road must be run upwards from the mouth of the Paranoá, pass near the city of Bon Fim, and connect with the continuation of the “União e Indústria” road, north of the height “das Taipas.”

(d) The Rio das Velhas. The navigability of this stream is a disputed point,† wanting serious study. It is known, however, that removing

† In writing upon the subject I have proposed a lateral tramway for the 70 leagues of rapids which begin near the Villa da Bonifácio, and which end at the Porto das Piranhas, the present head of steamboat navigation. This statement has aroused the wrath of the Riviers, who consider, justly enough, that M. Liais, and after him Senhor Dumont, have proved the navigability of the stream. Nor should the author call a boat approaching 5 palms, nearly 3½ feet, a “little embarcation;” it would, if more flat-bottomed, carry 26,400 arrobas, or 400 tons, and in the United States 29 inches suffices for rivieras navigation.
certain reefs and rocks would enable little embankments not drawing 5 palms to ascend it as far as the parallel of Trahims. In this part the mean velocity is 31 palms, and the depth 7 palms. The discharge at Trahims is 6000 cubic palms; above its confluence with the S. Francisco it is 743 palms broad, and discharges 9000 cubic palms. From the village of Trahims upwards it will perhaps be necessary to run a road along the Rio das Velhas and across the “vazer-schied” to the Parahyba, where it would connect with the continuation of the “União e Industria” road.

(c.) The Valley of the Jegrutahy. This stream, falling into the S. Francisco 4 leagues below the mouth of the Rio das Velhas, is 207 palms wide at the confluence, and discharges an average of 4800 cubic palms. When of usual depth, it may be navigated for 3 leagues; during rains, 28 leagues from the mouth.

(f.) The Valley of the Paracatú. This stream, the most important affluent of the S. Francisco, can be navigated by large canoes and boats to the Port of Purity, 64 leagues above its mouth. There is considerable intercourse, in spite of its many rapids and broken waters; and were the obstacles removed, navigation would become regular. Its breadth at the foot of Purity is 530 palms; it is 820 at 35 leagues from its mouth, and 1500 at the embouchure. The discharge is 60,000 cubic palms per second. According to the Municipal Chamber of Paracatú, it would be possible to drain into the Rio Escore—the headwaters of this stream—all the supply of the S. Marcos River, which is hardly three-quarters of a league distant, and which runs on a higher level.

(g.) The Valley of the Uruencia. This stream can be navigated by barks and rafts to Campo Grande, 25-50 leagues above its confluence with the S. Francisco and 10 leagues more by canoes. A little above the mouth it is 450 palms broad, and it discharges 18,000 cubic palms.

(h.) The Rio Pardo, a stream remarkable for obstructions caused by trees. At the confluence it is 188 palms broad, and the discharge is 5000 cubic palms.

(i.) The Rio Verde. This line, which divides Minas from Bahia, can be ascended by canoes for 30 leagues above its mouth, but its upper waters are extraordinarily shallow. In this useful part its breadth is 150 to 220 palms, and its discharge is 1200 cubic palms.

(j.) The Valley of the Carunbahna River. This stream forms, to the west of the S. Francisco, the division between Minas and Bahia. It is navigable for 22-50 indirect (= 16 direct) leagues above its embouchure. At the mouth it is 340 palms wide, and discharges 7400 cubic palms.

IX. Communication by the Valley of the Rio Grande.

Actual exploration has shown the Rio Grande to be navigable from the mouth of the Ribeirão Vermelho, 125 leagues distant from the town of Lavras, as far as the rapid called "da Boaína," or about 301 leagues; thence down stream there are too many rapids for free navigation.

This navigation, connected on one side by a road like the "Barra do Pinhão" and on the other with the valleys of the S. Francisco and, via the Rio das Velhas, with the Parahyba, would greatly benefit the municipalities of Lavras, Oliveira, Formiga, Três Pontas, Patrocínio, Bagagem, Fluminense, Araxá, etc.

According to the Municipal Chamber of Itajubá, the River Sapucahy, which is the main affluent of the Rio Grande in the Province of Minas, can be navi-
gated from the junction of the Santo Antonio to the Rapid “do Salto,” a little above its mouth. This water line will be important when the rich Valley of the Sapucahy shall call for a road across the Serra da Mantiqueira to connect it with the port “da Cachoeira,” the last station of the Dom Pedro Segundo Railway.

X. Connection with the Santos and Jundiaí Railway.

This line, opened in 1867, and likely to be prolonged, will benefit the south-western municipalities of Minas, as those of Jaguary, Caldas (especially), Pouso Alegre, and their neighbours. For instance, the nearest point of the line is only 12 leagues from the railroad of Jaguary, and a road to the town of that name, and to the city of Pouso Alegre, would be easily made.

VIII.—Administrations and Institutions of the Province. Provincial Administration.

And first of the Legislature.

The province now sends to the General Assembly of the Capital 20 temporary members, or deputies, and 10 life members (camara vitalicia) or senators.

The Provincial Assembly, which takes, by an Act added to the Imperial Constitution, the place of the old Councile-General, consisted of 36 members. The law, No. 842, of September 19th, 1855, changed the electoral system, by creating districts or circles; of these Minas had 20, each sending 2 members, and thus forming a chamber of 40. The decree, No. 2636, dated September 5th, 1860, reduced the districts from 20 to 7; each sends 6 members, except the 7th, which is represented by only 4; the total is, therefore, still 40. The Sessions take place at Ouro Preto, Capital of the Province.

The Deputies-General are elected by the same seven districts, which contain 546 parishes and 224 parishes; besides those lately created. The six first districts elect three, and the last two deputys.

The seven districts are:
1. Ouro Preto, containing 433 electors.
2. Sabara, containing 492 inhabitants.
4. S. Joao d’El-Rei, containing 448 inhabitants.
5. Caçapava, containing 386 inhabitants.
6. Serra, containing 418 inhabitants.
7. Montes Claros, containing 481 inhabitants.

The primary elections of Deputies-General take place on the first Sunday in November of the year in which the Houses are dissolved; and thirty days afterwards is the election. When the post of Senator is vacant, the Provincial President appoints a day for taking votes, three names are sent up to his Majesty the Emperor, who chooses one of them for the rank. The Provincial Deputies are chosen biennially, at a time appointed by the President of the province.

As regards the executive power, the Provincial President, nominated by his Majesty the Emperor, is, as everywhere in Brazil, the delegate of the Central Executive power, in virtue of the additional Act and the Law of October 3rd,
1834. He carries out, after duly sanctioning, the laws framed by the Provincial Assembly, and he watches the general interests of the public. He is assisted by various bureaux (repartições), some under district chiefs, others in the Presidential Secretariat, which is directed by the Secretary of Government. The seat of the Central Administration is Ouro Preto, the capital.

There are six Vice-Presidents, also nominated by his Majesty the Emperor; when the Presidency is vacant, these officers succeed to it in consecutive order.

Before the Declaration of Brazilian Independence, Minas was a captaincy, administered by governors or captains-general. Between 1820 and 1824 there was a Provisional Government.

As regards the judicial power. It is composed as usual in the Brazil, of judges and jurymen (jurados). Each Comarca (Arrondissement) has a Juiz de Direito (Juge de Droit); * in the terms (termos) which sometimes consist of two municipalities, there is a Municipal Judge, whilst the districts (distritos) have their Juges de Paix (Juízes de Paix). The latter are elected by the people—whereas the magistrates are nominated by the executive power; and their jurisdiction is limited to attempting reconciliation, without which no action can be brought before the judges. In all the comarcas there is a public prosecutor (Promotor público), a "District Attorney." The sessions of jury take place in the capitals of terms, and they are presided over by the Juges de Droit of the respective comarcas or by their substittutes.

In cases of the second instance there is appeal to the High Court (Relação) of Rio de Janeiro; and the decision of this body may be sent for review to the Supreme Tribunal of Justice. The latter, however, has no power to pronounce a decision—a peculiarity of which the people loudly complain—but must send the case for cassation to another of the six high courts existing in the empire.

The administrative jurisdiction appertains to the Provincial President, to the Supreme Minister of Justice, and in last instance to the Council of State (Counselo de Estado).

Municipal Chambers were also created for the better government, political as well as economical, of the municipalities. Each city has nine, and each town seven members (veredores), aldermen; the president is the member who has had the greatest number of votes. They are elected on September 7th, they enter upon their functions on January 7th of the following year, and their term of office is four years.

These corporations are simply administrative, and are compelled to assist the Central Administration of the Province; their deliberations are confined to the internal economy of their municipalities; and they cannot interfere with other chambers, or pay their expenses from the provincial treasury, without the approval of the President. Their fines (poucros) must be approved of by the Provincial Assembly.

Judiciary.

For administrative and judiciary purposes, the Province is divided † into 29 Comarcas, 62 Municipalities, 492 Districts of (judges of) peace.

Sometimes a certain number of districts is collected into a parish (freguesia); it is seldom, however, that this same parish contains districts of different municipalities.

* This officer does all that is effected by our civil courts. In Brazil the jury is confined to criminal cases.
† In 1714 the province had only sixteen cities and towns distributed amongst four comarcas, viz. Vella River, Rio das Mortes, Sabará, and Serre do Frio.

In 1807 there were—22 comarcas, 62 municipalities, 499 districts of peace, 317 parishes (freguesias), and 0 independent cures (curados independentes).
the Province of Minas Geraes.

Police.

This Province, like all others in the Brazil, is protected by a Chief of Police (Prefet de Police), nominated by the Emperor, and he is assisted by an Imperial Secretariat. Under this chief are Delegates in the municipalities. Sub-delegates in the Districts, and Inspectors in the Quarterlies = subdivisions of districts. There is a special police force, which will be described under the head of Military.

The Chambers also exercise public functions in their municipalities, by means of their officers (fiscaus), and with the assistance of the police authority.

The following Table will show the crimes committed in the Province during the five years 1856—1860.

<table>
<thead>
<tr>
<th>Table specifying Crimes.</th>
<th>1864</th>
<th>1865</th>
<th>1866</th>
<th>1867</th>
<th>1868</th>
<th>Time limited to five years.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Public Crimes</strong>—Resistance, removal or flight of prisoners, disobedience, provocation, irregularity of contract, falsity, perjury, coming, and destruction of public property</td>
<td>22</td>
<td>16</td>
<td>39</td>
<td>26</td>
<td>28</td>
<td>26</td>
</tr>
<tr>
<td><strong>Private Crimes</strong> against life, limb, &amp;c.—Homicide, infanticide, wounding, threatening, forcing oneself into another man's house, violence, rape, calumny, abuse, polygamy, thefts, bankruptcy, damage</td>
<td>316</td>
<td>349</td>
<td>544</td>
<td>345</td>
<td>429</td>
<td>437</td>
</tr>
<tr>
<td><strong>Police Crimes</strong> against property, religion, &amp;c.—Offences to religion and morals, mutiny, illegal meetings, vagrancy, making and using thieves' implements, undue use of the Press</td>
<td>47</td>
<td>45</td>
<td>54</td>
<td>44</td>
<td>32</td>
<td>48</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>385</td>
<td>410</td>
<td>637</td>
<td>615</td>
<td>569</td>
<td>511</td>
</tr>
</tbody>
</table>

The sanitary police is placed under a Commission of Public Health. This body has an Inspector-General, with delegates and vaccinators (commissioners vaccinadores) in different parts of the province.

Finance.*

This administration is placed under two heads:

1. General, or connected with the Treasury of the empire; it is directed by an Inspector, and it has a collectorate in every municipality.

* In August 22nd, 1864, the organized the Board of Provincial Income (Minhas Rentas Provinciais), and it at once entered upon its functions. The salaries were reduced to 39:490$000, amongst 39 officials, a general average of 127l. per annum.
2. Provincial, or of second rank; connected with the Boards of Inland Revenue; it is also directed by an inspector. Each municipality has a collectorate, subject to the same board, and the officers are almost always the same as those of the first rank.

Under this head must be enumerated the thirty-two receiverships which collect export dues and road taxes.

Military.*

The armed force of the Province is composed of the National Guard and three different corps of the Line and Police. The latter are exclusively employed in keeping order, on detachment duty, garrisoning cities, guarding persons, escorting treasure, and similar work.

The National Guard, organized in conformity with the General Law, No. 602, of September 19th, 1856, is composed of—

3 Corps of Cavalry, in 1866, = 3 corps.
14 Squadrons of Cavalry = 18 squadrons.
1 Company called detached (vedado) = 2 sections of battalions of infantry were added.
1 Company of Artillery = section of battalion.

50 Battalions of Infantry (active and reserve) = 55 battalions.
13 ditto ditto (reserve) = 27 battalions.
25 Sections of Infantry (reserve) = 27.
9 Companies detached (reserve) = 10.
3 Sections of Companies (reserve).†

These corps are distributed into 26 (in 1866 increased to 34) superior command, with the sole exception of 5 battalions, which are not thus subject. The effective total of officers and men is approximately 84,000 men.

The National Guard of Montes Claros district had not been organized in 1866.

Public Instruction.

There were some primary and a few secondary schools (and theological colleges at Caruça, Congonhasdo Campo and Farinha Pódre or Campo Bello, directed by the French Congregation of Missions), before 1855. On March 29th of that year, the Law (lei) No. 13, and its modification (regulamento),† No. 3, of April 22nd, 1855, created four classes (aulas) for commercial arithmetic, plane geometry, linear drawing, and land surveying; it also established a Normal School for educating teachers. Later alterations of the same Law instituted other classes of intermediate study, salaried chair of primary and secondary instruction, and subsidized various new-established private colleges. Thus the expenditure of this branch promptly arose to 320 contos (millions) of reis (= 32,000£)

In virtue of the Regulamento No. 44, of April 21st, 1859, the Province was divided into twenty literary circles or districts; forty-four agencies; and three delegacies, at Ouro Preto, S. João d'El-lot, and Diamantina.

To each agency was appointed a “Fiscal,” and for each school a visitor (visitaror) with their respective subordinates (suppletos); and all were placed under the “General Agency of Public Instruction.” Here were then 200 chairs of primary instruction (1st degree), of which 181 had teachers; forty-five of the second degree; and forty-four girls' schools, all provided with

* When I visited Ouro Preto, in August, 1867, it had no regulars (foz a d'primeira linha), except a few invalids attached to the National Guard.
† Besides these, in 1866, there were 4 battalions for active service, 1 squadron of cavalry, and 1 section of battalion of reserve.
instructors. The intermediary studies consisted of thirteen chairs of Latin and Poetry; seventeen of Latin and French; and a few of French, Geography, History, Arithmetic, and Geometry at Sabará, Barbacena, Ayuacuí, Piracicaba, Caldas, and one of dogmatic theology in the Episcopal Seminary of Mariana. There were also day-schools (externatas) at S. J. d'El-Rei and Diamantina, and a Lyceum at Ouro Preto, with the usual chairs.

The Provincial Law, No. 1054, of October 4th, 1860, and its modification No. 49, of January 31st, 1861, simplified the public and private educational systems, by suppressing the especial directory of instruction. This duty is now placed directly under Governmental superintendence, in the hands of municipal and parochial inspectors, the latter subordinate to the former. In the most populous cities and towns were also created local commissions, each of two members, who were required to fiscalize the method of instruction, to attend at examinations, and so forth. The chairs were reserved for passed teachers, or opened for competitive examination. At the same time the private establishments were re-organized and subjected to the same authoritative inspection. The Lyceum of Ouro Preto was suppressed, preserving, however, the chairs of Latin, Elementary Mathematics, Geography, History, French, English, Philosophy, Medical Botany and Chemistry, and, lastly, Pharmacy.

* The President Councillor Crippiniano proposed, in 1863, to institute, or rather to restore, as Ouro Preto a Lyceum whose professors might compose a "Council of Education."

† It also abolished the normal schools for the preparation of teachers, and it is said they did much injury.

The excellent report of a commission organized by the President Desembargador Pedro d'Amaro Correia Leite (1865), and composed of José Cesário de Faria Alvim, Rodrigo José Ferreira Brito, and Ovidio João Paulo de Andrada. Education in Minas Geraes had fallen off, and the province no longer provided as before statistists and senators. The two main causes of evil were the small salaries of the schoolmasters and the increased number of the schools.

In 1854 a population of 1,042,900 souls had 241 primary schools for both sexes, at an expense of 87,306,693. The matriculations were 13,812, and attendance 12,587. Each school then represented for 4218 souls 89 pupils (often nominal), and 51 bond fide. In 1860 there was a boys' school in every frequenter, and a girls' school in every city and town, with a legal minimum of 24 pupils. The total was then 16,017. In 1861, when primary schools were created for the districts, the numbers fell off to 11,996. The secondary schools, in 1854, had 889 pupils: in 1861 they had 730; in 1862 they had 716. In 1864-5 a population of 1,629,190 souls had only 295 schools, expending 182,043$551; matriculations, 14,006; attendance, 3171; 1 school for 5892 souls, who gave 50 nominal pupils, and 17 bond fide.

The Commission proposed to restore the status of 1859, and to establish 332 schools, each led by 2890 souls (the ratio in France being 1000, and in Holland 2500). As these could supply 284 pupils, they proposed a legal minimum of 36. They advocated a teachers' college at the capital, publishing a compendium of instruction, and certain measures for salaried direction and inspection, as well as administration. They would divide teachers, male and female, into three ranks, viz.:

1. Interim (temporary), dismissible by Government.
2. Effective, after three years' probation.
3. Vida ete (for life), after ten years' work.

The age of the male instructors to be between 21 and 60, of women between 18 and 50.

Unfortunately they would compel them to be Brazilians, a decided mistake, and they would abolish Latin study, of which a medium is much required for the civilization of a new country.
At present there are in the Province 367 chairs of primary instruction,* including fifty-nine for girls, and fifty-three of Sunday (in 1866 raised to thirty-four); 283 of the first, and forty of the second have teachers, and ninety-seven are without instructors. In 1869 there were 10,688 male and 2250 female, in the first, and in the second 7800 matriculants. Out of this total of 13,940 pupils, only about 7600 attended the schools.

Besides these there are eighteen (in 1866 increased to nineteen) private colleges for boys, at S. Gonçalo da Cambayna (Dalle); S. João d'El-Rei (Duval); Parahybara (Bauhezza); Serra do Campanha; Uberaba; Campo Bello; Mar de Hespérida; S. Sebastião do Correntes; Congonhas do Campo; Campanhacon and the Episcopal Seminary of the Mariana. The other six are of minor importance. For girls there are eight (increased to thirteen in 1866), viz., four in S. João d'El-Rei; one in Passos; one in Tantasá; the College of the Sisters of Mercy in Mariana, and the Nunnery and Orphanage (Recolhimento) of Macaúbas in the municipality of Caetité.

The Catechism of the Indigenes, once so powerful, in now unimportant,† and their civilization in these days progresses chiefly by the opening of roads, and the commercial and industrious movements which penetrate into their forests. In certain eastern and northern parts of the Province, influential citizens are appointed by Government as Directors of Indians, and they are all subordinate to a Director-General residing at the capital.

Public Works.

These were formerly under an especial bureau, directed by an Inspector-General. In 1859, it was abolished by the Provincial Assembly, and the duties were placed directly under the President and his engineers.‡

The public works are works of viation, as roads, bridges, buildings, and other works of public utility, as the canalisation and clearing of rivers, the piping of waters, paving of streets, charge of cemeteries, and so forth. As usual in Brazil, the roads are divided into general, provincial, and municipal, according as they concern the Empire, the province, or a subdivision of it. The most notable edifices for which public money is annually voted are the mother churches (matrones), the Presidential Palace, the palace of the Provincial Assembly; the buildings where the different bureaux work; the prisons and houses of the Municipal Chambers, the theatre, the market, the slaughter-house of the Capital, the barracks, and the ancient gold intendenties, which are now used for other purposes.

The measurement and partition of common lands (terras desoladas) is under the charge of the Second Section of the Presidential Secretariat; the especial bureau having been suppressed in 1860. Commissionary Judges have been appointed to thirteen municipalities of the province.

The administration of the Diamantina lands is in the hands of an Inspector-General and his delegates. There are six inspectorships created by the Decree No. 665, of September 6, 1852. These are Diamantina, Cerro, Conceição, Giro Mogol, Patrocínio, and Uberaba. Each district is divided into lots, which are let out.

* In 1865 the number increased to 385; in 1866 it fell off to 332, of which 312 where open.
† In 1866 there were twelve partial directories, and the chief officers had, as in the United States, military rank. Of late a few missionaries have been sent, but as a rule they would have been better away.
‡ This worked badly, as evidently it would. An over-taxed President could do little to forward measures of communication, by far the most important for the welfare of the province. At length, on January 2nd, 1866, a "Directory of Public Works" was created.
Provincial Institutions.

All the municipalities have their prisons, but most of them are mere private houses, hired or bought to serve at once as municipal chamber and jail; hence these places are often unsafe and unfit for their purpose. In all respects, that of the Capital is the best, the oldest and the most solid edifice in the province, which is also about to be improved; it can contain 300 prisoners. The Law, No. 189, of April 6, 1840, authorised the construction of proper places of confinement in the central points of the Commandery, a measure which must be deferred until pecuniary resources are found.

At Ouro Preto and S. João d'El-Rei there are public libraries, which, though lately founded, contain good Portuguese and French works. The former now contains 2000, and the latter nearly 5000 volumes.

Besides private printing-offices in various parts of the province, the Capital has a "Provincial Typography," which publishes the provincial laws, presidential reports, formularies, accounts of the public barazas, and an official journal, the 'Minas Geraes,' which appears three times a week.

There are theatres at Ouro Preto, S. João d'El-Rei, Sabará, Diamantina, Marianna, Congonhas, and other places. That of Ouro Preto was the oldest, and built with the worst taste; it was in a wretched state when the Dramatic Society of the Capital, in 1861, resolved to restore it, preserving only the still solid walls. This work was assisted by the Provincial Treasury, and the new theatre was inaugurated August 1, 1862.

Charitable Establishments.

Of these the most notable are:

The Hospital of Ouro Preto, which owes its origin to the Governor Gomes Freire de Andrade, Count of Bobadella. Its statutes, which are still in force, were taken from those of the Hospital de S. José de Lisboa. The establishment now possesses funds to the extent of 36:500$000 (=36500l.) in shares (cédulas) of the public debt, besides its house and grounds. It also takes charge of the infirmaries belonging to the police and to the prison, thus annually treating from forty to sixty patients. Its yearly expenditure is nearly 20:000$000 (=20000l.), which is covered by the interest of its funds, by casual income, and by the sums which the Provincial Treasury supplies for treating policemen and prisoners.

The Hospital of Sabará was founded by the deceased Antonio de Abreu Guimarães. It was opened on May 31, 1812, and its charter was approved on October 11, 1822. Since 1851 this establishment has been aided by the Treasury; its expenditure, however, is about 7:000$000 (=7000l.), and it is obliged to depend upon private subscriptions, which are liberal. In 1858 the building was enlarged.

The Hospital of Campanha was established by the Law, No. 30, of February 22, 1836, and inaugurated June 8, 1851. Between 1860-1861 it received 127 patients, with an income of 10:942$000 (=10942l.), and an outlay of 9:704$000 (=9704l.).

The Hospital of S. João de Deus in Santa Luzia was founded in 1840 by the Baron of Santa Luzia, who settled upon it 20:000$000 (=20000l.). It was opened on November 24, 1846, and between 1851 and 1859 it received 314 patients.

The Hospital of Barbacena was established by Antonio José Ferreira Armond (obit Jan. 10, 1822), who presented it with 20:000$000 (=20000l.) in money, 21:000$000 (=21000l.) in goods, and a cattle-breeding estate as a patrimony. It was opened on January 1, 1858, and as almost the whole gift had been expended upon its construction, it now depends upon charity and the small income of its foundation. In August, 1861, its funds, deposited in the
Bank of Brazil, amounted to 16,000$000 (= 1600F). It treats about fifty patients annually.

The Hospital of S. João d'El-Rei, which is the best in the province, holds funds to the extent of nearly 73 contos (= 7500F). It treats more than 250 patients per annum and receives a fewfoundlings.

The Hospital of the Sisters of Mercy, in Mariana, was founded with aims and though lacking funds and foundations, it is kept up by the zeal and economy of its staff. It annually treats twenty to thirty sick.

The Hospital of Itabira was founded in 1854 by Monsenhor José Felicíssimo do Nascimento. Between 1851 and 1862 it treated eighty-eight patients. In 1873 its income was nearly 10 contos (= 1000F), and its expenditure eight (= 800F). Its existing funds are 21,000$000 (= 2100F).

The Hospital do Sorvo owes its existence to the charity of the Barrão da Diamantina.

The Hospital do Paraíbuna was built at the expense of the Barrão da Hertiga. Its funds are now only 3,000$000 (= 300F), presented by H. M. the Emperor.

There are similar charitable establishments in Parnacatu, Poso Alegre, Baependy, Tres Fontas, Piratiqua, Rio Pardo, and other places. They are usually poor, and depend upon alms, but they are a great blessing to pauper patients.

Public Fountains and Aqueducts.

There are many old fountains, such as those of Ouro Preto, Mariana, Sabará, Sorvo, S. João, and S. José d'El-Rei, which are still well preserved. In more modern times, these useful works have been undertaken at S. João d'El-Rei, Barbacena, Queluz, Oliveira, Lavras, Bom Fim, and other places.

At the mineral baths of Caldas and Campâns, the Government has built accommodation for the patients.

Botanical Gardens.

There is (or rather was) but one in the province. It was created by the Order (Portaria) of September 2, 1825, and was shortly afterwards laid out in the suburb of the Capital, its present place. It is a pleasant promenade, and it annually supplies 6 to 8 arrobas of different teas, whilst its hives give 4 to 6 arrobas of wax. In former years mulberries were planted, and the silk-worm was bred. The first produced in abundance, but the second, for want of practical knowledge, was a failure.

Bank.

The only one now existing is that of Ouro Preto, a branch (caixa filial) of the Bank of Brazil. Its statutes were approved by Decree, No. 1490 of December 20, 1844, and it was installed on January 1, 1856. The capital is supplied by the Bank at the pleasure of the Directors, who can increase or withdraw it as circulation requires. This bank is administered by a President and two Directors, of whom one is Vice-President, whilst the other acts as Secretary. It may issue notes not less than 10$000 (= 10), and these are accepted by all the bureaux in the province.

Agricultural and Breeding Establishments.

The Law, No. 624, of May 30, 1853, created a Normal School of Agriculture. The statutes were last modified by the Law, No. 1067, of October 6, 1860, but as yet the institution has done nothing.

At the village of Cachoeira do Campo, 4 leagues from the Capital, is a horse-breeding estate (caudelaria), established by the Royal Letter (Carta Real)
of July 29, 1810, and since the Independence it has become the private property of H.M. the Emperor.

Markets and Slaughter-houses.

About seven years ago (1853) a market, which was also a public slaughter-house, was built at the Capital. There are minor establishments of the same kind at Sabará, S. João d'El-Rei, and other places.

Industrial Exhibition.

The Capital of Minas had the honour to inaugurate such exhibitions in Brazil, and the idea was first proposed in the Provincial Assembly. This body voted (Arts. 2 and 3 of Resolution No. 1079, of Oct. 7, 1850) supplies for a "world's fair," which was held between 7th and 14th September of 1861, in a large temporary building (barroco), raised for the purpose upon the Morro do Cruzéu. Few articles appeared, but, on the whole, the Exhibition served to stimulate industry.

On August 8, 1861, the Minister of Agriculture, Commerce, and Public Works issued an Order that Minas, as well as other provinces, should on the 3rd and the 7th of the following November, hold an Industrial Exhibition in the Saloon of the Provincial Assembly. Thus a short time was given to exhibitors, but the exposition was well attended. A total of 325 articles appeared, mostly from the municipalities adjoining the Capital. Of these 176 were raw produce (vegetable and animal), 93 were mineral, 66 were manufactured, and 3 were works of art. Of these objects, 157 were sent to the Exhibition of Rio de Janeiro, which began December 2, 1861.

On September 7, 1862, the second Exhibition of Minas was opened at Ouro Preto; it lasted seven days, and was well attended. Subsequently, the Government ordered a building for the purpose to be raised in the centre of the city.

Postal Arrangements.

The principal lines send their letter-bags on beasts, and many of the secondary lines employ men-carriers. To this rule the only exception is the line between the Bridge of the Parahybanas River and the city of that name; here the mail coaches of the "União e Indústria" Company are used. The line between the Ouro Preto and Parahybanas has a rate of 1 league per hour, the other lines of 6 to 10 leagues per day.

The central administration of the Post Office is at Ouro Preto, and is under the direction of the Minister of Agriculture, Commerce, and Public Works. Besides this there are sixty-seven agencies,* which keep up the postal lines.

Letter postage is uniform and independent of distance, and prepayment by stamps is compulsory. The charge is 60 reis per 4 octaves (half an ounce), and above it 30 reis for each 2 octaves or fraction of 2 octaves.

Weights and Measures.

In Minas, as in all the Brazils, the ancient system was that of Portugal, with its confusion and complexity. After the Independence, a few especial alterations were made, and at last the Law, No. 1157, of June 26, 1862, substituted all over the Empire the metrical system of France.†

* Increased in 1860 to 96.
† Every province and district had its different weights and measures, and this confusion still remains in the Far West. It is the same with British India, where Colonel Strohley lately drew up a report proposing to introduce the metre (39.3708 inches), the kilogramme (2.20 lbs.), and the litre (0.88 quart). India will probably show herself docile in relation to an improvement which caused in England the "Battle of the Standards."
In Portugal the unity of linear measure has ever been the vara (yard) = 5 palms; the former, according to the Lisbon standards = 1.998 French metres; the palm, therefore = 0.2186 metre. This relation must still subsist in Brazil, where it has never been abolished.

A provincial law of Minas Geraes determined, on April 1, 1835, that the league, generally said to be one-twentieth of a degree, should be = 5084 varas = 23,420 palms. This calculation was evidently made by combining the legal length of varas and palms with the rule that the metre = 10,000,000th part of a quadrant of the meridian. The last calculation is erroneous, nor is a league used as an aliquot meridional part, yet it appears certain that the Provincial Assembly intended to legalise the palm = 0.2186 metre.

Already, in 1884, the General Government had proposed to the Corps of Legislators a regular system of measures based upon the palm being = 22 centimetres. This was not adopted; yet the Custom-house regulations made thenceforward the palm = 22 centimetres;†

It may curiously be noted, as regards itinerary measures, that the degree at the equator, generally subdivided into leagues, consists, according to Bossio's measurements, of 111,306-306 metres. Consequently, the league of Minas, being equal to one-twentieth of a degree, contains 5565-328 metres. The league of one-eighth of a degree will be equal to 6163-638 metres.

D. João Segundo, in 1888, adopted as the unity of weight for Portugal, the "Colony mark" (Marco da Colonia), which from that time was considered the legal weight and = 233-81 grammes. The pound ought, therefore, to be = 2 marks; meanwhile the tariff of the Brazilian Custom-houses lays it down = 458-92 grammes.

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* There is also an old league = 43, and 1 of 1 degree.

The ancient Portuguese league contained 6700 English yards.

The old and common Brazilian league contained 3000 braças (or Brazilian fathoms) = 7216666 English yards = roughly 4 miles 76 yards.

The league of ¼ of 1° = English yards 6120 = 3 geog. miles.

The mile ditto = 2040 yards = 1 geog. mile.

The league of ¼ of 1° = English yards 6799-38 = 33345 geog. miles.

The mile ditto = 1113 English geog. mile.

The league of ¼ of 1° = English statute miles 3-480.

The mile ditto = 1-160.

The league of ¼ of 1° = English statute miles 3-660.

The mile ditto = 1-290.

† I have assumed the metre to represent as usual 39-37079 English inches.

Some writers (Haswell, &c.) give 39-38901.