A journey into Siberia, made by order of the King of France / By M. l'abbé Chappe d'Auteroche. Containing an account of the manners and customs of the Russians, with the natural history, and geographical description of their country. Translated from the French.

Contributors

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A MAP OF
THE
EMPIRE OF RUSSIA,
with
NORTHERN TARTARY.
Scales.
25 Leagues to a Degree.
105 Miles to a Degree.
69½ English Miles to a Degree.
The Empire of Russia is distinguished by three different Colours.
The barren Ground, which is not proper for Agriculture,
is coloured Green.
The Lands not cultivated, and which are proper for Agriculture,
are coloured Yellow.
The cultivated Lands, which in the northern Parts yield but poor
Crops, are coloured Red.
FROZEN SEA
SOUTH SEA
EUROPE
ASIA
CHINESE TARTARY
MEDITERRANEAN SEA
BLACK SEA
CASPIAN SEA
ISLES OF JAPON

Francis Boynton. 1774.

A

JOURNEY

INTO

SIBERIA,

MADE BY ORDER OF THE

KING OF FRANCE.

BY

M. L'ABBÉ CHAPPE D'AUTEROCHE,
Of the Royal Academy of Sciences at Paris, in 1761.

CONTAINING AN ACCOUNT

Of the MANNERS and CUSTOMS of the RUSSIANS, the Preſent State of their EMPIRE; with the Natural Hiſtory, and Geographical Deſcription of their Country, and Level of the Road from PARIS to TOBOLSKY.

ILLUSTRATED WITH CUTS.

Tranſlated from the French, with a Preface by the Tranſlator.

LONDON:
Printed for T. JEFFERYS, Geographer to the KING.
MDCCLXX.

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PREFACE

OF THE

TRANSLATOR.

THE diſpoſition of this work being conſiderably changed in the tranſlation; the tranſlator thinks it incumbent upon him to give an account of this alteration, and to offer ſome reaſons for having taken ſuch liberty with the original.

His firſt intention having been to abridge the work as much as poſſible, without paſſing over any material circumſtance, he has reduced two volumes into one. In doing this, he has brought together all ſuch parts as are more particularly connected with each other by the matter they treat of, and which are frequently ſeparated in the original. Thus, immediately after the journey from France to Tobolſky, is introduced the return from thence, which is at the end of the firſt volume of the original. The geographical account of Ruſſia is then given, together with the level of the road from Paris to Tobolſky, as it is found in the beginning of the ſecond volume of the original. But, it is proper to obſerve, that in the laſt mentioned part, the proceſſes, from which the concluſions have been obtained, are omitted; and the concluſions only produced, ſo far as they were neceſſary to communicate a

complete idea of the height of the ſoil of Ruſſia, as determined by the author's calculations. The calculations have been left out, becauſe they can be of no uſe to any one, who will not analyze them, and that any reader who ſhall chuſe to take this trouble, will not ſcruple to refer to the original.

After the account of the level, the mineralogical obſervations are inſerted, but thoſe only are tranſlated, which the author has made on the ſoil of Ruſſia. All the extracts from the ſecond volume are cloſed with the mineralogy; the aſtronomical obſervations, electrical experiments, *&c.* being omitted, becauſe they are foreign to the civil or natural hiſtory of the Ruſſian Empire, and therefore not immediately connected with the chief object of this work.

The account of tame and wild animals, birds, fiſh and inſects, is then taken from the middle of the firſt volume, and introduced next to the mineralogy. By this arrangement, the whole of the natural hiſtory of Ruſſia, is brought together according to the original plan. The obſervations on the climate of Siberia, follow the natural hiſtory, and the reſt of the tranſlation is continued in the ſame order as the original.

The French meaſures have been preſerved, to avoid the fractions which muſt have interfered by reducing them into Engliſh feet, and which would have made the reading diſagreeable: and to avoid inaccuracy, which muſt have prevailed, if the fractions had been omitted in the reduction *.

All the Ruſſian meaſures are reduced into French meaſures in the courſe of the work; but, for the convenience of the

* The French toiſe contains ſix Paris feet: the proportion of the Paris to the Engliſh foot is commonly reckoned that of 114 to 107; but from ſome late compariſons there is reaſon to ſuſpect, that this eſtimation is not perfectly accurate. This has been a farther inducement to the tranſlator to uſe the Paris foot, as being the moſt fixt and determined meaſure. Vid. Phil. Tranſact. vol. lviii. p. 324.—326.

reader,

reader, the proportions of theſe reſpective meaſures will be given at the end of the preface, as they are collected from different parts of the original.

After the table of meaſures, the reader will find the Ruſſian coin reduced to Engliſh, by calculating from the French coin, into which it is reduced by Mr. Chappe. In theſe calculations, the French livre has been valued at ten pence half penny ſterling.

The two thermometers mentioned by the author are Mr. Reaumur's, and Mr. Deliſle's. The reaſons ſpecified above, with regard to the toiſes, have induced the tranſlator to uſe the ſame thermometers; but, as it is the cuſtom of this country to compute by Fahrenheit's thermometer, he has ſubjoined Mr. Reaumur's and Fahrenheit's ſcale, with an explanation of the differences between them. It has not been thought neceſſary to give Mr. Deliſle's ſcale, becauſe Mr. Chappe has reduced it to the ſtandard of Mr. Reaumur's, whenever he has had occaſion to mention it.

If the reader ſhould think of comparing the tranſlation with the original, he will find ſome few omiſſions, beſides thoſe above mentioned; theſe may eaſily be accounted for from the principles already laid down: but, as they are of little importance, it has been judged unneceſſary to take any particular notice of them. Many of the notes alſo, have been thrown into the body of the work, wherever this could be done, without interrupting the narration.

In tranſlating the ſcientific parts of this book, which are well worthy the attention of the learned, the tranſlator's chief aim has been to be faithful and accurate: In the entertaining parts, he could wiſh to have preſerved the life and ſpirit of the original.

Before this preface is concluded, it is thought proper to give the account of a revolution which happened a few years ſince,

among the Kalmuck Zongors. This is introduced towards the end of the firſt volume of the original; but it has been omitted in the tranſlation, becauſe it is much lengthened by a particular detail of the mythology of this people, which it has been judged might as well be left out; eſpecially as their religion is in general the ſame as that of the inhabitants of the Thibet. But, the revolution itſelf, being of a curious and intereſting nature, not before made public, except in the Ruſſian language, a ſhort extract of the account of it ſhall be inſerted here.

" It is a matter of aſtoniſhment, that we ſhould know ſo " little of the Tartars inhabiting the ſouthern parts of Siberia; " and that the maps of theſe regions ſhould be ſo imperfect as " they are, while the Ruſſians who live near them, are able to " aſſiſt us ſo much in any inquiries we might wiſh to make " concerning the nature of theſe people, and of their country. " The revolution which has lately taken place among the " Kalmuck Zongors, is a remarkable proof, that there are " very important events which happen in this part of the " world, entirely without our knowledge. This nation, which " occupied an extent of country, larger than the kingdom of " France, was totally deſtroyed by the Chineſe in 1757, after " a ten years war. During all this time, and till the year " 1761, this event was known to the Ruſſian Empire only. " All the reſt of Europe was ignorant of this revolution; and " I was informed of it only as I was travelling through Siberia, " by ſome of the Kalmucks themſelves, who had eſcaped the " fury of the Chineſe, and by ſome Ruſſians living in Siberia.

" On my return from Tobolſky to St. Peterſburg, in the " month of November 1761, I communicated the information " I had received to ſome foreigners I had the honor to be " acquainted with; and ſome time after the Ruſſians pub- " liſhed an account of the fact in their own language.

" The

" The Kalmucks, or Eluths, are divided into three principal " branches: the Kalmucks Zongors, the Kalmucks Koſkotes, " and the Kalmucks Torgautes: the Kalmucks Zongors are " the objects of our preſent conſideration. This nation was " ſituated in the ſouthern parts of Siberia, extending from 90 " to 120 degrees of longitude; and from the 35th degree of " latitude, to the 48th, or thereabouts; including in this ex- " tent of country ſeveral neighbouring provinces, and the " leſſer Bucharia, which the Kalmucks had conquered in " 1683.

" The Kalmuck Zongors were governed by a Kam inveſted " with abſolute power, diſtinguiſhed by the name of Con- " taiſch. He was conſidered as the chief Kam of all the Kal- " mucks, and though the other branches of the Kalmucks had " their particular Kams, yet they were all in ſome meaſure " ſubordinate to the chief Kam, and uſed to ſupply him with " troops in time of war.

" All theſe people encamp under tents; and are divided " into hords or tribes, under one chief called Taiſka.

" The Kam of the Kalmucks Zongors reſided upon the " river Ili, which empties itſelf into a lake named in the " Kalmuck language *Balkach-nour*, or as ſome authors call it " *Palkai-nor*; it is ſituated in 97 degrees of longitude and 46 " of latitude.

" Theſe people became ſo powerful under the reigns of " Tſagan-Araptan-chon-taidji, and of his ſon Galden-Tcheren, " that the Ruſſians and the Chineſe were equally afraid of " them. The armies which theſe Kams maintained conſiſted " of about a hundred and fifty thouſand men, during the " ſeveral wars they carried on with great ſucceſs, for the ſpace " of forty years, againſt the Chineſe, the Tangoutes, the " Ruſſians, and other neighbouring powers.

" They

" They ſubdued the leſſer Bucharia, the capital of which is " Erken.

" The Contaiſch Tſagan-Araptan made his way acroſs " ſome vaſt deſerts, and ſurprized the nation of the Tangoutes, " ſituated between China and India. He alſo attacked ſome " Kalmucks called Chocout, ſubject to the Tangoutes, who " dwell near the lake *Kokou-nour*, or the blue lake. After " having plundered the Tibet, and pillaged the reſidence of " the Dalai-Lama, he returned into his own dominions with " an immenſe ſpoil.

" Galden-Tcheren ſucceeded him, and died in 1746; he " appointed his ſon Tſebek Dorjou, aged ſeventeen years, his " ſucceſſor; but the chief nobles diſliking this young prince, " depoſed him, had his eyes put out, and ſent him away into " the leſſer Bucharia, where he was aſſaſſinated. Some time " after, the Kalmucks Zongors proclaimed Lama-Darja, " aged thirty years. This prince, alſo a ſon of Galden Tcheren, " was illegitimate; and therefore, by the cuſtom of the coun- " try, his election was void. Beſides, there was a legitimate " heir then living, known by the name of the Noyon Debatchi, " who ſhould have ſucceeded to the throne as the neareſt " relation of Galden Tcheren; but Lama-Darja was ſo power- " ful, that the Noyon Debatchi not only concealed his pre- " tenſions to the throne, but was even obliged to make his " eſcape among the Kirſi-Koſſacks, with the Noyon Amour- " Saman, and ſeveral Kalmucks.

" The Noyon Debatchi, however, had ſtill a party among " the Kalmucks, which he took care to keep up while he " ſtayed among the Kirſi-Koſſacks, by whoſe aſſiſtance and " that of the Noyon Amour-Saman, a brave and enterprizing " prince, he undertook to aſcend the throne. The Noyon " Debatchi, attended by Amour-Saman, by the Kalmucks " who had followed them, and by a corps of Kirſi-Koſſacks,

re-entered

" re-entered his dominions, ſurprized the Contaiſch in the " night-time, defeated his army, and made himſelf be elected " Kam in the room of Lama-Darja, who had been ſlain in " the engagement. Some Noyons (or princes) refuſed how- " ever to acknowledge the new Kam, and formed themſelves " into a powerful faction. Amour-Saman being diſſatisfied " with the Noyon Debatchi ſince his election, in which he had " given him ſo much aſſiſtance, joined the rebels. Under " ſuch a chief they became formidable, but their ſucceſs was " not equal to their courage. The Noyon Debatchi gave " battle to Amour-Saman, in which the latter was totally de- " feated, and obliged to make his eſcape into China.

" The Chineſe, who were alarmed at the great increaſe of " power among the Kalmucks Zongors, took this opportunity " of keeping up the civil war, which had broke out among " them. The Emperor received Amour-Saman, with the " greateſt marks of diſtinction, and he was acknowledged " Tſin-wan, or prince of the higheſt rank, by the Bodko- " Chan, a Chineſe, ſent into the country of the Kalmucks at " the head of a Chineſe army. The Kam Debatchi advanced " towards Amour-Saman, and gave him battle; but Debatchi " having been defeated and put to flight, was purſued and " taken priſoner in the town of Tourfan *, from whence the " Chineſe conducted him to Pekin.

" When the Chineſe aſſiſted Amour-Saman, they had en- " gaged to fix him on the throne of the Kalmucks; but it was " by no means their intention to fulfil this engagement; for the " Kam Debatchi was received at Pekin with the greateſt " reſpect, and rather as an ally than an enemy. Amour- " Saman then perceived that the policy of the Chineſe " tended to the entire deſtruction of his nation. Prompted

* The town of Tourfan or Turfan is ſituated towards the northern borders of the leſſer Bucharia. This battle was fought in 1754.

" by theſe ideas, he ſecretly perſuaded the Kalmucks and " Mongals, who made part of the Chineſe army, to revolt; he " then put himſelf at their head, and attacking a body of the " Chineſe who thought themſelves very ſecure, entirely defeat- " ed them, and retreated into the country of the Kalmucks " purſued by the reſt of the army. He engaged in his party " ſome troops of the Zongors; by the help of which he at- " tacked the Chineſe army, and obliged them to retire in the " greateſt confuſion. Amour-Saman then aſſumed the title of " Contaiſch, with a reſolution of ſupporting the dignity. " Part of the nation acknowledged him, the reſt preſerved " their allegiance to the Kam Debatchi, who was ſtill a pri- " ſoner at Pekin. Several hords of Mongals openly ſhook " off the Chineſe yoke; ſo that to all appearance an obſtinate " war was likely to enſue. The Emperor of China ſent a " large army into the country of the Kalmucks. He ſet all " the Kalmucks free who had been taken priſoners when the " Kam Debatchi was defeated, and treated them with great " kindneſs; ſo that they joined themſelves to the Chineſe troops, " under a ſuppoſition of their going to fight for their ſovereign " Debatchi, whom the Emperor of China ſtill kept in ſafe " cuſtody, in order to inſure the fidelity of the Kalmucks.

" At the approach of the Chineſe army, moſt of the hords " of the Mongals which had revolted, ſubmitted themſelves " again, and their chiefs being taken up, and ſent to Pekin, " were there puniſhed with death. The Zongor princes who " were in the Chineſe army, influenced the greater part of the " troops of Amour-Saman: he was defeated, and eſcaped " among the Kirſi-Koſſacs, where he had before attended De- " batchi.

" Theſe people who live only on rapine and plunder, obſerv- " ing that the Kalmucks Zongors were exhauſted by civil wars, " and unable to make any reſiſtance, entered their country by

" force,

" force, ſword in hand, ſpreading deſolation and deſtruction " wherever they paſſed. On the other hand, the Chineſe did " the ſame, under pretence of aſſiſting the Kalmucks. Theſe " unfortunate people, attacked on all ſides, at length aban- " doned their native country to their enemies; and to the " number of twenty thouſand families, eſcaped towards Siberia; " from whence they removed on the borders of the Volga, " putting themſelves under the protection of Ruſſia, to which " moſt of them became ſubject.

" Amour-Saman finding himſelf not in ſafety among the " Kirſi-Koſſacs, retired towards Siberia, in deſerts and moun- " tains almoſt inacceſſible; but being purſued every where by " the Chineſe, he at laſt took refuge in Siberia, in 1757, and " died at Tobolſky.

" The Chineſe were no ſooner informed that Amour-Saman " had retreated into Siberia, than they demanded, that this " prince ſhould be given up to them; or, as the Ruſſians ſay, " that he ſhould be ſhut up for ever. After his death, it was " agreed that his body ſhould be conveyed on the frontiers of " Siberia. The Chineſe ſent ſeveral times commiſſaries to " inſpect it. At my departure from Tobolſky, I left two " ambaſſadors of the Kalmucks in that city; who had been " ſent to St. Peterſburg, before the reign of Amour-Saman, " to requeſt, that the Ruſſians ſhould deſtroy the forts they " had conſtructed on the borders of the river Irtyſz. Theſe " ambaſſadors, on their return to Tobolſky, were informed " that their nation exiſted no more.

" According to the account the Ruſſians give, Amour-Sa- " man did not enter into Siberia; but retreated on the fron- " tiers of that province, where he was ſoon after ſeized with " the ſmall-pox, of which he died. He had been joined by his " wife *Bitei*, who has been ſeen at St. Peterſburg in 1761: " ſhe was a daughter of Galdan-Tcheren, her firſt huſband

" was named *Ichidangin*, an elder brother of Amour-Saman,
" by whom ſhe had a ſon, named *Pontſouk*.

" The unfortunate Amour-Saman made a conſiderable ſtay
" at Tobolſky, where he was confined a long time in the arch-
" biſhop's country houſe; but the reaſons which have induced
" the Ruſſians to conceal this circumſtance in their account of
" the affair, have never been revealed."

Ruſſian long meaſures reduced to French toiſes, feet, &c.

The Arcin is equal to 26 inches 6 lines $\frac{5}{10}$ths of the Paris foot.

The Sagen is equal to 6 feet 7 inches 6 lines $\frac{9}{10}$ths.

The Werſt is equal to 552 toiſes 3 feet 7 inches 6 lines.

The only Ruſſian weight mentioned in the work is the *poede*, which contains, according to Mr. Chappe's account, forty Ruſſian and thirty-three French pounds.

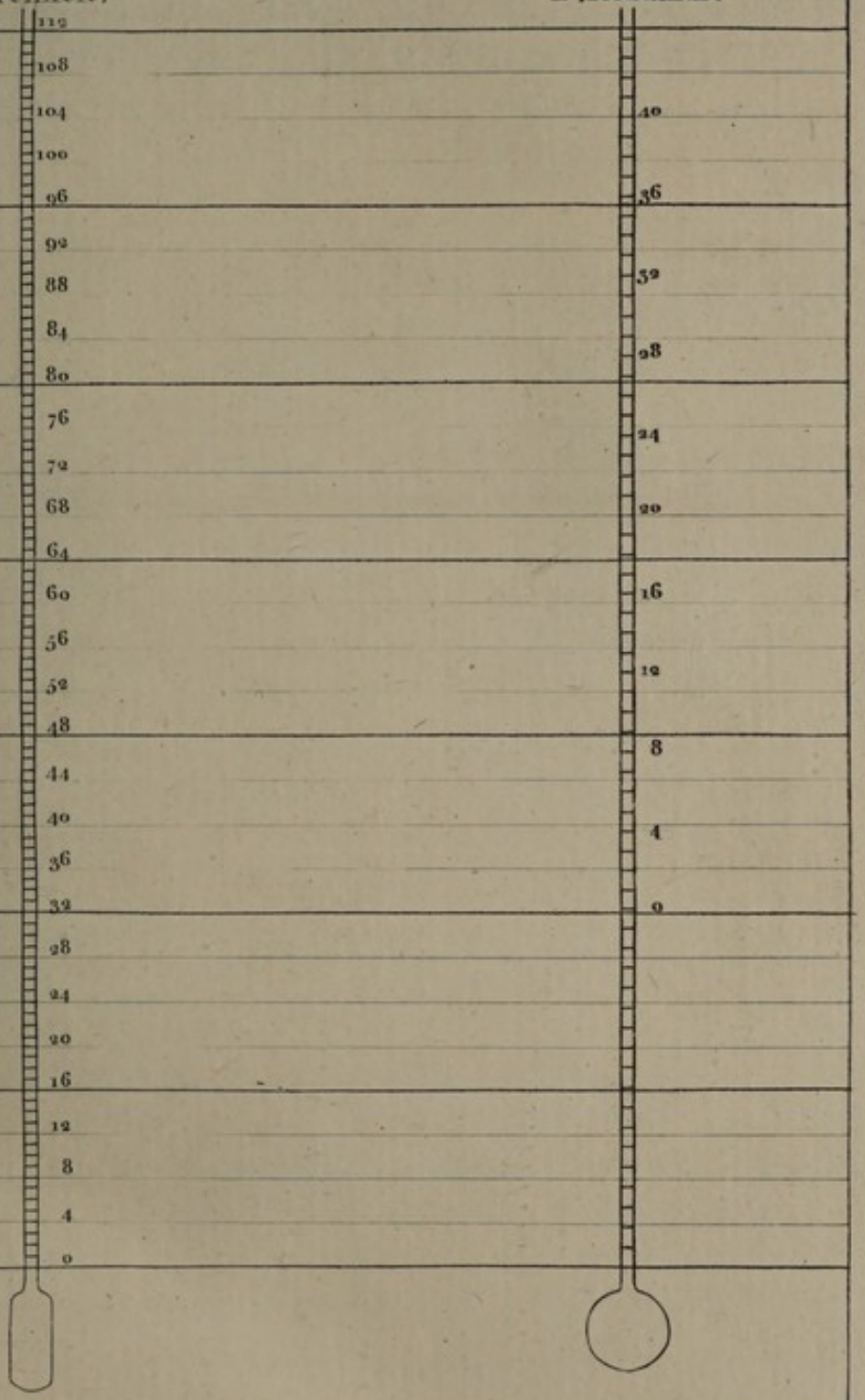
The French pound is reckoned equal to one pound one ounce three drachms of an avoirdupois pound; and the French quintal equal to 109 avoirdupois pounds.

Ruſſian coin reduced to Engliſh. The copec, equal to one penny ſterling. The rouble, equal to four ſhillings and four pence halfpenny ſterling.

From the Scales in the Plate it appears, that M. de Reaumur's 0, or freezing point, coincides with gr. 32 of Fahrenheit's thermometer. This is the general opinion, and therefore it has been thought more proper to follow it, than to adopt Mr. Martine's, who ſuppoſes in his *Medical Eſſays*, pag. 235, that *Mr. de Reaumur's freezing point anſwers to ſomething above gr.* 34 *of Fahrenheit's Scale.* It may alſo be obſerved, that one diviſion of Mr. Reaumur's Scale, is nearly equal to two of Fahrenheit's.

It

SCALES of FAHRENHEIT's and D. REAUMUR's Thermometers.



It is neceſſary to acquaint the reader, that Mr. Chappe's third volume which is a French tranſlation of the hiſtory of Kamtſchatka, printed at St. Peterſburg in the Ruſſian language, is not given here, becauſe the ſame hiſtory was before tranſlated into Engliſh by Dr. Grieve, and publiſhed by Mr. Jefferys, in 1764, in one volume quarto.

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I.

The Hiſtory of KAMTSCHATKA and the KURILSKI ISLANDS, with the Countries adjacent.

Illuſtrated with Maps and Cuts. Publiſhed at *Peterſburgh* in the *Ruſſian* Language, by Order of her Imperial Majeſty; and tranſlated into *Engliſh* by JAMES GRIEVE, M. D.

II.

VOYAGES from ASIA to AMERICA.

Made by the *Ruſſians* for completing the Diſcoveries of the North-weſt Coaſt of *America*. Tranſlated from the *High Dutch* of M. MULLER, of the Royal Academy of *Peterſburgh*. Illuſtrated with Maps. The Second Edition.

III.

The GRAND INSTRUCTIONS to the Commiſſioners appointed to frame a new Code of LAWS for the *Ruſſian* Empire.

Compoſed by her Imperial Majeſty *Catherine* II. Empreſs of all the *Ruſſias*. To which is prefixed, A Deſcription of the Manner of opening the Commiſſion, with the Order and Rules for electing the Commiſſioners. Tranſlated from the Original, in the Ruſſian Language, by MICHAEL TATISCHEFF, a Ruſſian Gentleman; and publiſhed by Permiſſion.

AN

ACCOUNT

OF A

JOURNEY

TO

SIBERIA.

BEING ordered by the King, and appointed by the academy, to go to Tobolſky, in order to obſerve the Tranſit of Venus over the Sun, it was my intention to embark in Holland, that I might avoid the inconvenience of conveying a large apparatus of inſtruments as far as St. Peterſburg by land; but the laſt of the veſſels deſtined for this paſſage had already put to ſea. I was therefore neceſſitated to undertake the journey by land, and this obliged me to make ſeveral new diſpoſitions very different from my original plan. M. Durieul, colonel in the King of Poland's ſervice, was then going to Warſaw; I deſired leave to accompany him, and we ſet out at the end of November 1760. I had very little reaſon to be concerned at my having miſſed the Dutch veſſel, as I learned a few days before I left Paris, that ſhe had been wrecked on the coaſt of Sweden.

The rains had made the roads ſo bad, that we did not reach Straſburg till after eight days travelling: we ſtaid there two days in hopes of getting our carriages repaired, but they had ſuffered ſo much from a variety of accidents, that we were obliged to take others. All my barometers and thermometers had been broken in the night between the firſt and ſecond of December, by one of the carriages falling into a ditch, five or ſix feet deep. I made new ones at Straſburg, while we ſtopped there.

Having experienced ſuch difficulties in our journey through France, we were apprehenſive we ſhould meet with much greater in Germany; and indeed, theſe difficulties increaſed ſo faſt, and ſuch a number of accidents befel us, that we were forced to go to Ulm, and embark on the Danube, although I was apprized before I left Paris, that the navigation of this river was very uncertain at this time of the year on account of the fogs.

Knowing we had no particular map of the Danube in this part of its courſe, I took this opportunity of tracing one with the utmoſt preciſion. I wave this ſubject at preſent, as I ſhall have occaſion to reſume it hereafter.

Embarked on the Danube, we could not proceed but in the day time, and ſometimes only for a few hours, becauſe of the fogs, and of ſome dangerous places to be met with in this river. The fogs were the more troubleſome, as the banks of the river were overflowed: there was but a ſmall paſſage left between the bridges and the water; ſo that it was neceſſary to ſee the arches from a great diſtance, in order to chuſe out thoſe where the current was leaſt rapid.

The Danube, having croſſed that extenſive plain in the country about Ulm, flows on between two ridges of mountains; which are at firſt but low and far diſtant from each other: they riſe and come nearer together by imperceptible degrees,

degrees, till at laſt they form only a narrow paſſage at a few days ſailing from Ulm. Nothing is here to be ſeen in general, on the banks of the river, but ſteep and barren mountains: in the more fruitful parts of the country, the meadows, the ſlope of the hills, and the woods ſcattered here and there, with intervening towns and villages, afford every inſtant a new proſpect, and gratify the eyes of the contemplative traveller with a variety of objects, each more delightful than the other.

The channel of the Danube is ſo ſtraitened in ſome parts of theſe mountains, by ſeveral projecting rocks, that veſſels are never ventured to go up the river through theſe narrow places, while others are coming down. The ſailors are obliged to be very careful in going through theſe ſhort paſſages, for the rocks being perpendicular, there can be no hopes of preſervation, if a ſhipwreck ſhould happen.

From the natural diſpoſition of this place, we were unable to get on much in the courſe of the day; but as ſoon as the veſſel was at anchor, I uſed to go upon theſe mountains to aſcertain their height with the barometer. I never found any one of them more than 300 or 350 French toiſes high, but theſe were topped by others whoſe height ſeemed to increaſe as they were farther diſtant from the Danube. Theſe mountains were all covered with ſnow, although there was not the leaſt ſign of it in any part of the country about the banks of the river.

When we came near Ratiſbon, we left the veſſel, to viſit the environs of this city, with intent to make ſome inquiries into natural hiſtory. This was conſtantly our employment every time we diſembarked. M. Durieul's uncommon good nature, joined to the moſt extenſive knowledge, prompted him to be peculiarly earneſt in aſſiſting me in theſe purſuits. We had but juſt got out of the boat when that gentleman diſcovered a ſtone, on the borders of the river, with a ſingular inſcription upon it. Some ſpades were brought from the boat to clear

away the earth from the ſtone; we attempted to copy the characters, with which we were unacquainted: but the length of the inſcription, the intenſe cold, and the night coming on made us reſolve to quit the taſk. We determined therefore, to dig up the ſtone, and take it with us into the boat. Its ſize put us to the neceſſity of going for aſſiſtance to the neighbouring village. The peaſants informed us, that there were many ſimilar inſcriptions all around that place. This circumſtance convinced us at once that there was nothing very wonderful in our diſcovery. We then applied ourſelves, though rather too late, to find out what this really was. It turned out that theſe ſtones were nothing more than ſeveral Jewiſh tomb-ſtones, and that the inſcriptions were epitaphs in Hebrew.

Although this adventure rather diſconcerted us at firſt, yet we reſolved to entertain ourſelves with it; and the exerciſe we had taken in the purſuit of it, had ſharpened our appetites for ſupper. In coming away we had the good fortune to ſave a young man's life, who was going to throw himſelf into the Danube, on account of a quarrel with his miſtreſs; being apprized of his intentions, by ſome perſons who were running after him, we ſtopped him, and put him ſafe into their hands.

We ſet out the next day, and paſſed the bridge at Ratiſbon, which was ſaid to be a very dangerous ſpot, and, in ſupport of this opinion, we were told that an ambaſſador had loſt his life in paſſing it. We were convinced that the death of the ambaſſador had been the only foundation for this extraordinary report.

We ſtopped at noon the ſame day, to take in proviſions at a ſmall town on the banks of the Danube, and were much ſurprized on returning to the boat, to find a young lady on board, of fifteen or ſixteen years of age: ſhe had an air of conſequence united to a moſt pleaſing form: her down-caſt eyes, her behaviour, her timidity, her dreſs, all beſpoke her to be of good family;

family; we invited her therefore into our apartment; and ſhe accepted of the invitation: the melancholy looks ſhe now and then directed to us, were expreſſive of confuſion and deep diſtreſs. We encouraged her, by paying her all poſſible regard; and found, after a few queſtions, that ſhe lived with an uncle, a curate, at a few leagues diſtance from the town where we laſt ſtopped: ſhe had ran away from him, becauſe he wanted to compel her to take the veil. We conducted her to Paſſaw, where her family was.

On the 24th of December, we came to a large village. This being Chriſtmas-eve, we went to church to hear the ſervice, which was very long. Next day, I found that my devotion had been the occaſion of my loſing a portmanteau, containing great part of my linen. This was the firſt loſs I ſuſtained in my wardrobe, of which I brought very little back to Paris; the reſt being ſtolen from me in the courſe of my journey.

After ſeveral days ſailing, we arrived on the 27th at Lintz: we found about this town a large quantity of the granite ſtone, wrought for ſtair-caſes, chimnies, and other ornaments. The ſailors informed us, that theſe granites were brought from quarries in the neighbourhood of the town, where they were commonly to be met with.

The Danube divides Lintz into two parts, communicating with each other by a wooden bridge; the exact length of which, I found to be three hundred and fifty paces. I computed this diſtance at five hundred toiſes, and the depth of the river at this place, according to the mariner's accounts, is one hundred feet, or about ſeventeen toiſes. The fog, which had been thick all the morning of the 28th, began to diſperſe towards noon, and we immediately put to ſail. The weather having been tolerably favourable for ſome days paſt, we met with very few

few delays: and reached Vienna on the 31ſt of December 1760.

I had the moſt favourable reception from their Imperial Majeſties at this Capital; they were pleaſed to ſhew their gracious attention to the Sciences and the Academy, by deſiring that I might be preſented to them. While I ſtayed in this city, I viſited the Emperor's cabinet of natural hiſtory. From the complete ſeries of the articles it contains, it may be reckoned among the fineſt in Europe. I have never met with any collection ſo elegant in the claſs of corals.

The arſenal under the direction of Prince Lichtenſtein, is remarkably curious, and deſerving attention, as well from the quantity of artillery this Prince has enriched it with, as from the great ſtock of arms of all kinds to be found there. They are diſpoſed and arranged, in a manner moſt pleaſing to the eye. The Prince has built a hall in the midſt of the arſenal, where he has placed two beautiful marble ſtatues of the Emperor and Empreſs. Their Imperial Majeſties having been to ſee the arſenal, were agreeably ſurprized with this freſh inſtance of Prince Lichtenſtein's attachment and zeal; but the Prince was ſtill more ſo ſome time after, on ſeeing his own buſt in the ſame hall facing their Majeſties ſtatues; a condeſcenſion which was the moſt flattering mark of diſtinction a ſubject could receive, and at the ſame time reflected honor upon their Imperial Majeſties, whoſe goodneſs and generoſity captivates all who come near them. Prince Lichtenſtein procured me a ſeries of petrified wood from the Carpathian mountains, of marbles, and of different pebbles not leſs curious.

I knew it was the cuſtom at Vienna, to be very ſtrict in examining every thing which came into the city. Fearing leſt my inſtruments packed up with the greateſt care, ſhould receive any damage from this inſpection, I had begged the favour of Count Staremberg, ambaſſador from their Imperial Majeſties

at

at Paris, to get leave for me to paſs, without having them unpacked. He was ſo obliging to write, on this account, to the Baron de Cotec, comptroller of the cuſtoms. I was infinitely pleaſed with this gentleman's politeneſs, and ſatisfied with the orders he had given.

In the courſe of my voyage upon the Danube, I had obſerved the height of the barometer: but the uſe I intended to make of my obſervations, required that I ſhould compare them with thoſe made at Vienna. Here I met with Father Hell, a Jeſuit, profeſſor of aſtronomy, well known by his great proficiency in that ſcience, and by his ephemerides with which he obliges the learned world every year. Father Lieſganig, of the ſame ſociety, and who applies himſelf ſucceſsfully to the ſame ſtudies, took the trouble upon himſelf of making obſervations correſponding with ſuch as I ſhould make hereafter, and of communicating thoſe he had already made while I was on the Danube. In his obſervatory, we determined the magnetic variation to be thirteen degrees weſtward, and at the ſame time we compared our barometers.

Baron Van Swieten, firſt phyſician to the Empreſs, and member of our academy, informed me, that he uſed electricity with great ſucceſs in the rheumatiſm, and other diſorders of the like nature, although very little benefit is experienced from it in France. Can this difference ariſe from the diverſity of climates, or is it owing to any injudicious method of applying the remedy?

I left this capital the 8th of January, after having experienced much kindneſs from the Duke de Pralin, then ambaſſador at Vienna. We were joined by M. Favier, who was going to St. Peterſburg, as ſecretary of embaſſy: and we arrived on the 9th of January 1761 at Nikolſburg, a ſmall town pretty well built, where there is a tolerably fine ſeat, and a beautiful fountain. Brünn, where we ſtopped the ſame day,

is by no means an ugly town; it is fortified, although but indifferently. The citadel is placed on an eminence.

Our journey from Vienna had hitherto been over a plain where the roads were very fine; but they began to grow bad about the town of Brünn, which we did not leave 'till ten o'clock at night, having been detained there by the breaking of one of our carriage wheels. I loſt one of my barometers by this accident, and next day the other, by the carriage falling into a ditch: part of the night was ſpent in drawing it out; as we were obliged to unload it, which we did on all theſe occaſions. Theſe accidents were ſo frequent, that I was in continual apprehenſions for my inſtruments. The lights, we had provided ourſelves with at Vienna, began to fail; and without theſe it would have been impracticable for us to travel in the night, ſo that I began to fear we ſhould not reach Tobolſky in due time. The ſame day we came to the river Bianavoda; which appeared to me about thirty toiſes broad: its borders only being frozen, we waded through it. Although it was not more than two feet deep in this place, yet the horſes could not croſs it without great difficulty, the looſe flakes of ice being very troubleſome to them, as well as the frozen borders, which it was neceſſary to break. At length we arrived on the 11th at Neutiſchein, where we paſſed the night, and ſet off from thence the 12th inſtant, at ſeven in the morning. The Carpathian mountains were ſtill on our right, at the diſtance of a league, or a league and a half, ſometimes leſs. We dined at Friedeck, a ſmall town of Sileſia, pretty well peopled; where a great fair was then kept. The dreſs of the people of this town, and of the country round about, appeared to me the ſame as that of the inhabitants of Moravia: the women wear ſmall white petticoats very ſhort; they have generally a kind of coloured waiſtcoat on, and a white linen veil faſtened to the head. They wrap themſelves in this veil, which comes down

down as low as the waiſt: ſome of them have nothing but a piece of white crape flowing on their ſhoulders; their ſtockings are all plaited, as if they were made of coarſe packthread, twiſted round their legs; and the whole of their dreſs is as ridiculous as their figure. The men are tolerably well made, and their dreſs is very ſimilar to that of the country people in France.

The cold was not very intenſe, although it was now the 12th of January: the thermometer was only at three degrees below 0; a great deal of ſnow fell: on the 13th, the thermometer fell to five degrees, and continued at the ſame point on the 14th: but in the following night, when we were ſtill at Bilitz, it fell all at once to fourteen and an half. We left this town at eight in the morning, in the midſt of this intenſe cold; which I was the more affected with, as I had not before experienced any great degree of it. We reached Zator the ſame day, at two in the afternoon: our baggage did not come in 'till eleven at night; for we had been obliged to have it conveyed on the country people's carts, on account of the damages our carriages had received.

Zator is a large borough town, ſituated on the frontiers of Poland, of which Count Dunin is the *Staroſt*, (or Lord): he was not only kind enough to inſiſt upon our lodging with him, but ſeeing our carriages in very bad condition, he alſo made his people chuſe out the beſt ſort of wood from his ſtore-houſe, and gave the ſtricteſt orders to have them completely repaired. Notwithſtanding the Count's endeavours to make our ſtay as agreeable as poſſible, we were preparing to ſet out as ſoon as our carriages were ready; when we were informed, that the Viſtula was not yet quite frozen over. The cold which had been ſo intenſe on the 15th gave way all at once, and the thermometer was only at 0 on the 17th. It being very uncertain whether the river would ſoon be frozen over, we

reſolved to have the ice broken; and, on the 18th, we croſſed the river near its head in a ferry; we arrived the 19th at Cracow, and the 22d at Warſaw.

Warſaw is the capital of Poland: it is a very fine city, and contains ſeveral elegant buildings; but it is remarkable, that it has not one ſingle inn. A ſtranger who ſhould happen to come there without acquaintance, might run the riſque of lying in the ſtreet. The Polanders are indeed ſo very hoſpitable, that ſuch an incident is not likely to happen very frequently. The Marquis de Paulmy, our ambaſſador, was exceedingly kind to me. He preſented me to the late King on the 23d, and to the Prince of Courland.

The women of Poland are in general handſome and amiable; they improve their underſtanding by reading, and the knowledge of various languages: their full dreſs is commonly after the French manner; but in undreſs, they wear a Poliſh habit, which is a ſort of very elegant riding-dreſs. Inſtead of caps, they wear a kind of dragoon's cap; this dreſs is prodigiouſly becoming to ſuch as are well made. They love company and pleaſure, but are ſtrictly virtuous; which ſeems to be rather the effect of ſuperſtition, than of poliſhed manners, of the climate, or of true principles of religion. It was then the carnival, a ſeaſon devoted to pleaſure: the ambaſſadors, and ſome of the Poliſh noblemen, gave the moſt expenſive entertainments; where every body was tired as uſual with form and ceremony, while the Ridotto was the only place for real amuſement.

The Ridotto, is a public diverſion, in ſome reſpects like the maſked ball at Paris: it conſiſts of ſeveral rooms; dancing is going forward in ſome, gaming in another, beſides which there is one room for refreſhments. The Polanders come there in a maſquerade habit; this, according to the cuſtom of the country, is often a long robe; underneath which they wear a kind

kind of waiſtcoat, and their heads are ſhaved and covered with a cap. The Poles are generally tall and well made: the ſpirit of liberty ſhews itſelf in all their actions; and the haughtineſs of their behaviour, ſeems to imply that particular reſpect is due to the young women they chuſe to dance with. The mild and pleaſing aſpect of the women, the livelineſs of their eyes, the ſlenderneſs of their waiſts, and their activity, make a remarkable contraſt with the men.

The Poliſh dances are moſt in faſhion at theſe balls; the dancers form a circle as large as the room will allow, with the perſons of the firſt rank at the top; they turn round the room each man with his partner: the man has little to do, only twiſting himſelf about; while the woman, whoſe hand he takes hold of, has more action. The muſic is as melancholy and tireſome as the dance; it is thought to expreſs great dignity. After the Poliſh, Engliſh dances are moſt in uſe; their livelineſs and ſpirit make up for the ſlowneſs of the former.

The kingdom of Poland is tolerably well peopled: the nobles are perfectly independent, and the nation is ſubjected to the neighbouring powers; from the anarchy of the government, the ſovereign is without authority, the ſtate without defence, and expoſed to every invader: the lands belong to the nobles; they diſtribute a certain portion of land and cattle among the country people, who are their ſlaves. The country man enjoys the produce of the land given to him; but is obliged to work with his own oxen and horſes four days in the week, to cultivate the lands of his lord, or to ſubmit to any thing which may be required of him, even to ſervile employments.

Each Lord has a ſort of farmer, named *Podſtaroſte*; to whom he allows a certain ſtipend, either in money or land; and under whoſe direction there is a *wout* or under-farmer, who gives an account every evening to the farmer of the ſtate of

the village, and the work of the day. If any one of the ſlaves has been remiſs in coming to his buſineſs, or has behaved himſelf ſo as to diſpleaſe the under-farmer, he is immediately puniſhed: this is done by laying him along the ground with his back quite bare, one of the ſlaves then holds his head, another his feet, while a third is employed in flogging him ſeverely with a whip, which they call *kantzouk*. The under-farmer drives the ſlaves to work with his whip, like horſes, and treats them in the ſame manner.

While the men are employed in cultivating the lands of their Lord, the women are buſied in dreſſing his flax, waſhing, or other offices peculiar to them: if neglectful, they are puniſhed with the *kantzouk*, as well as the men. If any of the ſlaves attempt to evade this tyranny, by eloping from the village, they are ſoon ſent back by the neighbouring lords, according to a ſettled agreement between them: in this caſe, they are ſo ſeverely puniſhed, that ſuch incidents rarely happen.

The Poles have always a great number of ſervants, taken from among their ſlaves: they are allowed a certain quantity of bread every week, and a meſs made of a kind of barley, cabbage, and ſalt, every day: they have alſo a livery, ſtockings and boots, given them, and one guinea a year for wages.

The manner of travelling in Poland requires a conſiderable train of attendants; it is cuſtomary on theſe occaſions to carry every thing that is uſeful or convenient; all ſorts of proviſions, all the common utenſils of life, tables, chairs, and even beds, when a viſit is intended to a friend's houſe, where there are never more of theſe than are of uſe in the family, ſo that every traveller is ſuppoſed to bring his bed along with him.

The countryman alone pays the taxes in Poland, which are very moderate: the chief revenues of the lords ariſe from corn, butter, and honey, which the bees depoſit in the trunks

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of trees in the middle of the woods. Perſons who are convicted of taking honey not belonging to them, are condemned to die: after their trial, they are faſtened naked to the tree where the bee-hive is; their belly is then opened near the navel, ſufficiently to let out all the bowels, which are twiſted round the tree, and they are thus left in the moſt inhuman manner to expire. This ſort of puniſhment, however, is at preſent almoſt out of uſe.

The fortunes of all the Poliſh nobility are by no means equal: the greater number have eſtates of their own, others live entirely on the King's bounty, who muſt be benevolent from neceſſity. The King only has the right of giving *ſtaroſties*, or conſiderable land eſtates. They belong to the family no longer than while the father lives, unleſs the King pleaſes to renew the grant to his heirs. It ſometimes happens, therefore, that very opulent men in this country are reduced at once to extreme poverty: all the family is then obliged to be in the ſervice of ſome of the rich people, and often of the ſtrangers reſiding at Warſaw.

This ſtate of ſervility is not degrading in Poland: when the Diet meets, the gentleman ſervant quits his maſter to go and give his vote. He ſometimes obtains a *ſtaroſty*, and becomes a man of conſequence in his turn.

All the great people of Poland call their ſeats palaces, although, in any other place, they would only be looked upon as the houſes of private people in a very middling ſtation. There are however ſome fine ſeats, eſpecially the palace of the Grand-marſhal of Poland.

I left Warſaw on the 27th, with Mr. Favier; we croſſed the Viſtula, which at this place is about ſixty toiſes over, on the ice. The 28th, we paſſed through the village of Pirdeleiova. Five French people of one family had been murdered a few days before near this village, by ſome Ruſſians. The

mother, whoſe name was Lebel, carried on a conſiderable trade in jewels at St. Peterſburg; ſhe was then on her return from France, where ſhe had been to make ſome new purchaſes, and had ſettled her daughter at the ſame time, whom ſhe was taking with her into Ruſſia with her ſon-in-law; an accomptant, and a maid ſervant. Theſe travellers were informed on their arrival at Warſaw, that ſome Ruſſian carriers were then going to ſet out for St. Peterſburg: from a principle of oeconomy, they made a bargain with theſe men to conduct them into Ruſſia. At Wegrow, the mother imprudently expoſed ſome of her jewels. The Ruſſians immediately laid a ſcheme for murdering them, and in order to accompliſh this deſign privately, they deſired the travellers to ſet out at two in the morning, pretending that if they made it later, they would be obliged to croſs a very dangerous river the night following. The travellers conſented; the two men were in one carriage, the three women in another. The Ruſſians had contrived to ſeparate the carriages, at ſome miles diſtance from Pirdeleiova, while the travellers ſlept. They began by diſpatching the two men with a kind of dagger they have always at their girdle. They then went to the carriage where the women were; the young married woman was immediately ſlain without making any reſiſtance; the mother defended herſelf as well as ſhe could with a knife, and even wounded one of theſe villains. The ſervant, in the mean time, had eſcaped into a neighbouring wood, where ſhe thought herſelf ſafe, but they followed and killed her alſo. They afterwards confeſſed all theſe circumſtances. After having murdered this whole family, they broke open the trunks, ſeized the moſt valuable things, and then purſued their journey to Ruſſia. An officer in the ſervice of the Empreſs Queen paſſed by this place a few hours after the aſſaſſination: he went back to Wegrow, and acquainted the people with this horrible tranſaction. The

curate, from whom we had the ſtory, gave ſuch a deſcription of the murderers as might enable the officer to find them out. He ſet out immediately, inquiring at every village what road they had taken. They had gone on in the great Poliſh road, intending certainly to reach the Ruſſian territories as ſoon as poſſible, where they imagined they ſhould be out of danger; but the officer made ſo much haſte, that he came up with them before they could get out of the Poliſh dominions. They were at a Jew's houſe, where they had depoſited their plunder. He had them taken up in ſpite of their reſiſtance and that of the Jew, acquainted the republic of the affair, and then continued his journey to Peterſburg.

This murder made the more noiſe in the country, as the Poles are in general very hoſpitable, and that ſuch crimes are but little known amongſt them. They never ſpoke of this affair without tears, and ſeemed to find a kind of comfort in recollecting the moſt trifling actions of theſe unfortunate travellers, in ſpeaking of their integrity, their goodneſs, and eſpecially of the mutual affection of the young married couple, which was apparent on every occaſion.

No ſooner was this incident made public in Ruſſia, than it was required that the murderers ſhould be given up. This ſtep appeared very extraordinary to the Poles, and to the ſtrangers who were then at St. Peterſburg, for the crime having been committed in the territories of Poland, the puniſhment of it certainly belonged to the republic. But the Ruſſians thought their greatneſs was concerned in the fate of theſe villains, and the Poles, by complying with their requeſt, gave a freſh inſtance of their own weakneſs.

On the 29th, at ten in the morning we arrived at Bialiſtok in very cold weather; the thermometer was eleven degrees below o in the carriage. Our journey hitherto from Warſaw had been over a fine plain, covered with granite ſtone, all the

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way from Wegrow to within ſeven or eight leagues of Bialiſtok. Theſe granites are of different ſpecies and various colours; they are to be found every where from the ſize of four feet in diameter to that of two inches, and commonly of four or five inches; their form is for the moſt part ſpherical, which is a proof of their having been conveyed in ſtreams of water.

Warſaw is entirely paved with theſe granites; but there are none to be found about Bialiſtok, nor indeed any other kind of ſtone. As ſoon as we were arrived at this borough, which may be conſidered as a ſmall town, we went to ſee the ſeat of M. Braniſky, Grand Marſhal of Poland.

A large avenue, with a portal of ſtone at each end, leads up to the houſe: the firſt portal is inſulated and rather uſeleſs; the ſecond riſes in a cupola, and forms the gateway of the houſe. Over this portal is placed a ſun-dial, and a griffin gilt underneath it, ſupporting the arms of the Grand Marſhal. On coming into the court-yard, which is very large, two pteromata, built after the Roman manner, are ſeen on each ſide; in the middle of theſe is a large pavilion. The body of the building faces the portal. The veſtibule or entrance into the houſe is ſmall; four columns of black marble ſupport the flight of ſteps, which is narrow, and has not a grand appearance: The apartments of the Marſhal and his Lady are behind the columns; the firſt to the right hand, the laſt to the left. The Grand Marſhal's apartments are elegant, and ornamented with a variety of fine figures in bronze; thoſe of his lady are magnificent, every where ſplendid with gold, and decorated with painting and ſculpture, diſpoſed with infinite taſte. From theſe apartments I went down to ſome baths, large enough to hold more than twenty perſons, but they are not properly taken care of. On the firſt floor there is a fine ſaloon, in which however the painting is but indifferent; to the right and left are different rooms, pretty elegant, but diſpoſed with

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leſs taſte, and in every reſpect inferior to thoſe of the Marſhal's lady. The King's apartment is very beautiful; and the Queen's very rich, but antique; the bed is embroidered all over with gold.

The gardens, the groves, and the green-houſe, are well laid out; the park is very large, well filled with trees, and there is a fine aviary in it. This ſeat looks rather like the palace of a King than the houſe of a private man. We were treated with great civility by the Marſhal's people, although their lord was abſent.

The want of water is a very great inconvenience to which the town of Bialiſtok is expoſed; the inhabitants are obliged to have it conveyed from a great diſtance, and this muſt of courſe be very expenſive to them. The town is ſituated in the midſt of an extenſive plain, very well cultivated. We left this place the ſame day we arrived there, and after paſſing through a great many woods, in our way from Bialiſtok, we reached Sokolka at eleven at night.

On the 30th, at eight in the morning, the thermometer was ſtill at 11 degrees below 0. Notwithſtanding this ſevere cold, there was no ſnow to be ſeen any where but in the woods. At nine we came to the borders of the river Memel, the real name of which is Niemen. The river being only frozen at its borders we ferried over it, and afterwards went up a ſtreet leading to Grodno: this ſtreet, as well as the whole town, is paved with granites of various colours. The town is divided into two parts, upper and lower: the upper contains the citadel, which is inſulated, and communicates with the town by means of a draw-bridge, placed over a deep gorge. The road is very good from Warſaw to this town, but farther northward the ground becomes more uneven, and interrupted with hillocks. As we were croſſing a ſmall river at the diſtance of a mile from Rotnica, the ice gave way, and

one of our carriages ſtuck. We faſtened all our horſes, which were ten in number, to this carriage, but ſtill found it impoſſible to draw it out, ſo that we were obliged to ſend for four more at eleven o'clock at night. The cold grew exceſſively ſevere; we kindled ſome fire in the midſt of the ice and ſnow: at laſt, while we were at ſupper, the horſes came, and with much difficulty we got out of this unlucky ſpot. The hills became more frequent as we advanced, and although not very ſteep, were ſtill exceeding troubleſome, being moſt of them covered with ice from top to bottom, and the horſes in Poland not being ſhod. On the 31ſt, at four in the morning, we came to a river, which we croſſed in a ferry, after working for two hours to break the ice on its borders. We took freſh horſes at the village of Mereck, on the oppoſite ſhore, and ſet out from thence immediately. Having reached Olitta, we were preparing to paſs the Niemen a ſecond time, when we were told that the ferry had been carried away by the current, and that we muſt take the croſs road to go to Kowno. The roads, however, began to be very bad, and we had ſcarcely got a mile on our way, before we met with other frozen hills; the aſcents were very difficult, and it was impoſſible to get to the top without putting all the horſes to one carriage: in coming down the hills, ſome of the horſes were faſtened to the back part of the carriage. We paſſed the whole night of the 31ſt of January to the 1ſt of February in travelling after this manner, and arrived the ſame day at Gniezno, a village of which Count Paſcy is lord, who was then at Warſaw. Not finding any horſes at this place, we ſent to beg the favour of Count Paſcy's farmer to get us ſome; he procured us ſome very good horſes, which brought us to Darſzoniſki before noon, notwithſtanding the extreme badneſs of the roads. Here we found the poſtilions had gone above ſix miles out of the road to Kowno, ſo that we were obliged to go back again. We

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were in hopes, from the accounts the inhabitants of this village gave us, that the river Niemen, which was not more than three quarters of a mile diſtant, would be completely frozen over, but when we came to its borders, we found the ice not ſtrong enough to bear us; ſo that we were obliged to go another way. Near the hamlet of Podſtrava, we came to a hill, which we were labouring in vain to get up, from three in the afternoon to ſix in the evening; for although it was but a low hill, yet the aſcent was ſteep, and covered with ice from top to bottom. We went back to the hamlet we had juſt left, which was within gun-ſhot of this ſpot; here we reſted our horſes for ſeveral hours, and then attempted again to paſs the hill. We took all the country people of the hamlet along with us, and burned links to ſave our flambeaus. With the help of the ten horſes to one of the carriages, we got half way up the hill, but could not poſſibly get any farther, although ſome of us were employed in whipping the horſes, and others in puſhing up the carriage. All our attempts came to nothing, and we returned to the hamlet of Podſtrava, where we paſſed the night. As we were obliged to paſs all theſe frozen mountains on foot, M. Favier had got ſeveral falls; the laſt accidents of this ſort were of a dangerous nature, as he had received a number of bruiſes which were very painful to him. The houſe we put up at was a kind of inn, which exhibited an appearance of the moſt extreme poverty; it belonged to a Jew; there was but one bed in it for the father and mother, the reſt of the family ſlept on pieces of very dirty rags ſtrewed upon the ground. The people in this part of the country have no other light than what they get from laths of wood ſet on fire, and ſtuck horizontally in the wall. Here the countryman eats bread in ſummer time, as well as in Lithuania, but is obliged to go without it in winter, becauſe he ſells moſt of his corn: the cachra is then uſed inſtead of it, which is

nothing more than peeled barley, boiled in water as rice is. The better kind of people in Poland eat a great deal of pork, and ſour *krout*, which is nothing more than cabbage cut in pieces, and thrown into water for ſeveral months till it turns ſour. They have alſo a ſoup they call *barſez*; made of the juice of beet-root, turned ſour by being put into a caſk for ſeveral months; this liquor is mixed with water, cream, and meat, when they can get it; and they reckon it a very nice diſh.

The inhabitants of this hamlet are ſo poor, that they could ſcarce ſupply us with a little ſtraw to lie down upon. Although we were much fatigued, yet we ſlept little, as the continual delays we were expoſed to made us uneaſy. M. Favier was intruſted with very important diſpatches to the Marquis de l' Hopital, ambaſſador at St. Peterſburg, which required ſo much haſte, that he was frequently obliged to give the Duke de Choiſeul an account of the number of obſtacles we met with on our way to that capital. The countryman we had ſent for freſh horſes came back at four in the morning, and told us that the people would not ſend their horſes more than half way to meet us; as they would then have been of little ſervice to us, we reſolved to attempt getting round the hill, and therefore waited till day-break. We collected all the people of the hamlet, and on the ſecond of February, with their aſſiſtance, we at length got out of this place, where we had been detained ſince three o'clock in the afternoon of the 1ſt inſtant. At eleven in the morning we reached Kamſtiſki, and came to Kowno the ſame day about four in the afternoon.

On the 3d of February the thermometer roſe as high as 0, which made us apprehenſive of a thaw; but came down again in the evening as faſt, the wind being changed to the north: our journey all this day was over a plain. On the

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4th, in the morning, the cold ſlackened a little, and the thermometer was not more than five degrees below 0: the wind was very high, and blew up clouds of ſnow, which were very troubleſome to us; one of our poſtilions could not ſtand it, but left us in the middle of the woods, and made his eſcape ſo effectually, that we could not poſſibly find him out, but were obliged to ſend for another from the neareſt village. We came to Kraſki at eleven at night, and to Mittaw on the 5th inſtant, about ten in the morning.

Mittaw is the capital of Courland, and the place of the Duke's reſidence. It is a fine town, but in general not well built: on coming out of it we met with the palace the Duke de Biren built, while he was favourite of the Czarina Ann; which would be incomparably elegant if it was finiſhed.

The roads from Kowno had been very good. We reached Olin the ſame day, after paſſing the boundaries of Livonia and Ruſſia, at about a mile from this place. All the country was covered with ſnow, and ſledges began to be uſed. We came to Riga at ten at night, and put up at an inn called Krieg, where we found a number of people who had juſt done ſupper; the company was ſeated round a table, from which every thing was removed, except bottles and glaſſes. Each perſon had a pipe near three feet long; they drank and ſmoked alternately: ſome were leaning on the table; others were ſtretched at their eaſe in an arm-chair, with their waiſtcoats unbuttoned: nothing was to be heard but the jingling of glaſſes, the claſhing of bottles, and the noiſe made by the ſmacking of the ſmokers lips. Clouds of ſmoke aroſe on every ſide, as inconvenient to the ſight as diſagreeable to the ſmell. They were ſo thick, that perſons at the other end of the room were ſcarcely diſcernable. Some very pretty and well-ſhaped ſervant maids made their appearance now and then; they were neatly dreſſed, and did

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not ſeem as if they meant to pique themſelves upon a profeſſion of chaſtity.

We had but an indifferent ſupper; reſt indeed ſeemed more neceſſary to us than food. We took a view of the city the next day, while ſledges were preparing, on which we had our carriages placed.

Riga is a large commercial town, ſituated on the Dwina. Before we came into the town, we croſſed this river on the ice; it is about twice as broad as the Seyne. The ſea not being more than two leagues diſtant from Riga, the merchandize is eaſily brought up to the city. This town formerly belonged to the Swedes, who loſt it in the time of the Czar Peter I.: it has preſerved all the privileges ſtipulated for, when it capitulated with Ruſſia. There are few nobles in the town, except among the ſtrangers; the inhabitants being chiefly traders.

After dinner we went to pay our reſpects to the governor, who is of the Dolgorouſki family; but, as he was very far advanced in years, and not well, we could not poſſibly ſee him.

We received great civilities from M. de Wittinhof, in the council of the regency of Livonia, and Knight of the Order of St. Alexander Newſki. He had married the daughter of the famous General Munick, although that gentleman was baniſhed into Siberia.

Our ſledges were finiſhed on the 7th inſtant, and we left Riga the ſame day at ſix in the evening. We had ſcarce got half a mile from the town, when we found that there was no more ſnow; we were then in an extenſive plain, which it was impoſſible to paſs with our ſledges. The night was yet very dark, and we were far from any aſſiſtance. We attempted to fix the carriages on the wheels again; but although we had flambeaus, yet the darkneſs of the night and the weight of our baggage

baggage made it impoſſible for us to ſucceed in our attempts. We ordered an interpreter, whom I brought with me from Warſaw, to deſire the poſtilions to go into the neareſt village for help: a ſharp diſpute immediately aroſe between the Ruſſians and the interpreter. As we were ignorant of the language, we could not poſſibly diſcover what they were quarrelling about; and my interpreter being in liquor, we could neither make him liſten to reaſon, nor hold his tongue. We were ſtill expoſed to the open air in the moſt ſevere weather, with little hope of being ſoon releaſed from this ſituation: at laſt, with much difficulty we underſtood, that the poſtilions refuſed to go in ſearch of aſſiſtance, on account of the darkneſs of the night. I came near and ſhewed them a rouble, a Ruſſian coin amounting to about four ſhillings and ſix-pence Engliſh; they immediately ran off, not leaving even one man with us, and returned very quickly with the country people. It was thought ſufficient to take off the ſledges, which ſerved for the fore-wheels, and to faſten them behind the carriages. We got on our way again about eleven at night, but when we had gone a few ſteps farther, the ropes belonging to the other ſledges gave way: the country people, who had not left us, made us underſtand it would be abſolutely neceſſary to take off the other ſledges, and that they would do this for us, in conſideration of another rouble; we had already given them two, and one to the poſtilions; this made altogether about eighteen ſhillings Engliſh. Although we were not well pleaſed at being thus impoſed upon, we were ſo anxious to get out ſoon from this place, that we gave whatever they aſked. We went on quietly the reſt of the night, and part of the next day; but as the ſnow grew more and more thick, and we met with nothing but ſledges on the road, we were determined from what had happened to us, not to have recourſe to them, till it

was quite impoſſible to do without them. On the 8th inſtant there was a moſt violent ſtorm; whirlwinds of ſnow aroſe on all ſides; the largeſt objects were ſcarcely diſcernable at the diſtance of a few yards; the wind drove the ſnow with ſuch force, that the horſes ſtopped every minute, and it was impoſſible to get them on. To complete our misfortunes, one of the poſtilions overturned the horſes, and the carriage where the baggage was, into a hole: we then gave up every thing for loſt; however we got out of the carriage immediately, and after working for two hours, we proceeded again on our journey, and came at laſt to Lenzenhof. The wind ſoon grew calm, and we paſſed the next poſt to Wolmar without any accident, which was very extraordinary. The country was covered with ſnow, and the road was very wide; it grew narrow on coming out of Wolmar; the way was tracked over a heap of ſnow, gathered up by the winds between a hedge-row of trees; it was hardened only in the beaten paths; the poſtilions conducted us with the greateſt care through this dangerous road. We were juſt getting out of this paſs, when the carriage we were in, diſappeared all at once, ſo that the horſes heads could but juſt be ſeen, and we were buried in the carriage; there remained only a ſmall opening at the top of the coach, by which we got out, without waiting for help. We tried in vain to diſengage the carriage, by faſtening all the horſes of the other carriage to it: we were obliged to ſend for ſhovels from the neareſt village, and after having ſpent the greater part of the day in this buſineſs, we at length got the carriage and horſes out of the hole. We had our carriages fixed on the ſledges at the next village, and arrived on the 10th at two in the afternoon at Derpt. Here we learned by ſome Ruſſians, juſt come from St. Peterſburg, that there was ſuch a quantity of ſnow on the road, and the roads were ſo narrow, that

we could not poſſibly travel with our carriages. The truth of this report was confirmed by the poſt-maſter, who aſſured us we ſhould not be able to reach St. Peterſburg in a fortnight with our carriages; we therefore left them, and took four ſledges in this town, two for ourſelves, and two for the ſervant and the baggage. I experienced, for the firſt time, the eaſe of travelling with ſledges; we went on with the greateſt velocity, without meeting with any accident. The cold increaſed however every day as we came nearer to St. Peterſburg; on the 11th, the thermometer kept up at twelve degrees and a half till noon, and fell four or five degrees in the night-time. As we were almoſt in the open air on our ſledges, we ſuffered much from the ſevere cold, which we were not uſed to. At length we came to St. Peterſburg on the 13th of February, after a journey of about ten weeks. We had met with ſuch a variety of accidents every day, that I deſpaired of reaching Siberia in time for the obſervation.

I went immediately to the Marquis de l' Hopital, our ambaſſador, who was extremely kind to me. He was juſt going away; the Baron de Breteuil remained miniſter plenipotentiary.

I had left France, in conſequence of the academy of St. Peterſburg having requeſted that of Paris to ſend one of its members into Siberia, where ſome aſtronomers of Ruſſia were alſo to meet. Theſe aſtronomers had been already gone a month, before I arrived at St. Peterſburg: their departure, and various difficulties ſtarted before I came, had given riſe to ſome doubts with regard to my journey to Tobolſky. Some of the academy of St. Peterſburg propoſed divers other parts of Ruſſia, leſs diſtant, and more eaſily to be got at, than Tobolſky; but as the Tranſit of Venus over the Sun would be performed in leſs time in this capital of Siberia, than in any other part of the globe; it could not have been viewed to ſo much ad-

vantage any where elſe. Theſe reaſons were eaſily comprehended by a miniſter of ſo much knowledge as the Baron de Breteuil. Count Woronzof, High Chancellor of Ruſſia, a lover and protector of the Sciences, readily came into his meaſures; the obſtacles which had been raiſed were removed, and my departure was at laſt fixed for the 10th of March.

The Empreſs Elizabeth gave the moſt circumſtantial orders on this occaſion. All the aſſiſtances I met with in travelling through Siberia, were owing to the protection of this Princeſs.

When I had reached St. Peterſburg, I was ſtill at the diſtance of eight hundred leagues from Tobolſky. This new journey required other preparations, very different from thoſe I had been employed in at ſetting out from France. I was obliged to take all ſorts of proviſions with me, even thoſe which are moſt in common uſe, ſuch as bread; and to ſupply myſelf with beds, and all the neceſſary utenſils of life. I could not do without an interpreter, nor without a clock-maker, to mend my clocks in caſe of accident. I ſcarce had occaſion to aſk for any thing, but was anticipated in all my wants by the Baron de Breteuil; who was as earneſt as myſelf about this obſervation, the ſucceſs of which is chiefly owing to his attention; and indeed the nation is much indebted in many other reſpects to the conduct of this miniſter.

The ſeaſon was ſo far advanced, that I began to be apprehenſive, leſt a thaw coming on before I could reach Tobolſky, ſhould fruſtrate the deſign of my journey, by obliging me to remain in the midſt of the woods of Siberia. I truſted, however, to the very expeditious manner of travelling on ſledges, and ſet out from St. Peterſburg on the 10th of March in the evening, with four of them. There are ſeveral kinds of theſe

ſledges,

ſledges, although in many reſpects they are built nearly upon the ſame plan *.

The ſledge in which I travelled, at ſetting out from St. Peterſburg, was cloſe on all ſides, but very heavy on account of the quantity of things I had put into it. It was

* The lower part of the ſledges is made of two pieces of wood, each of which is about ſix inches wide, and three inches thick at the end of the back part of the ſledge. The ſame dimenſions are continued for the length of two or three feet; they afterwards gradually diminiſh as they come nearer to the other extremity, which is turned up in a circular form at the fore-part of the ſledge, to the height of about two feet, as in the ſledge at Plate I. in which there are four children drawn by two others. (The wood is bent in this manner while it is ſtill green, and by fixing it thus againſt the houſes, where it is ſometimes left for a year.) In the middle of, and underneath theſe two pieces, which are the chief parts of the ſledge, there are two plates of iron, almoſt as thin as the iron of ſkates, and of the ſame uſe. Theſe two pieces are fixed at the diſtance of two feet and a half from each other, by ſtrong pieces of wood placed tranſverſely: over this firſt frame a ſecond is placed, faſtened to the former by pegs, as may be ſeen in the forementioned ſledge; but the pieces of this ſecond frame are not ſo ſtrong as thoſe of the firſt. The common ſledges in uſe, for carrying proviſions and baggage, are conſtructed in this ſimple manner; they are ſometimes drawn by men, but it is common to faſten ſeveral horſes to them, yet more frequently one ſingle horſe, by means of two ſhafts fixed to the ſides of the ſledge; the driver then ſits down on the proviſions, and if the ſledge is empty, he ſometimes ſtands upright in it, while the ſledge is going on with the utmoſt rapidity. Other ſledges for travelling are of two kinds, ſome are quite covered, others only half over. The laſt are moſt frequent, they differ little in conſtruction from thoſe I have juſt deſcribed; upon the ſecond frame eight wooden bars are placed, of the ſame height as the two bent pieces of wood; theſe are faſtened at bottom by pegs, and at top by two beams. At the back of the ſledge, a kind of top, like the head of a chaiſe, is formed with hoops; or rather the ſledge, in this ſtate, makes the ſkeleton of a carriage, known by the name of dormeuſe: it is cloſed on all ſides with leather, and moſt commonly with a kind of matting made from the barks of trees. The ſledge thus conſtructed is exceedingly light; the figure of it may be ſeen at Plate I. Two beams, faſtened together behind the ſeat, are placed obliquely on the ſides of the ſledge to ſtrengthen it; a mat fixed to the anterior border of the head of the ſledge, keeps out the weather; and this may be let down, or taken up at pleaſure, while another mat is put upon the feet, to prevent the ſnow from falling into the carriage. The moſt convenient ſledge is that which may be ſeen in the middle of the Plate: it is a very light box, ſix feet long, three feet wide, and four or five feet high, with a door and a window on each ſide; there are the ſame conveniences in it as in a common carriage.

drawn by five horſes abreaſt; the watchmaker and my ſervant were in another half covered over; a ſerjeant, the Chancellor was ſo kind to give me for a guide, choſe the third ſledge, where my proviſions were; and my inſtruments were in a fourth.

As I was deſirous that my attendants ſhould be ſupplied with every convenience I could poſſibly procure them, I allowed them to lay in all ſorts of proviſions they liked beſt, except wine, becauſe we could not carry a ſufficient quantity of that for every body. I contented myſelf with accepting from M. Breteuil only four flaſks for my own uſe, in hopes indeed of finding ſome at Tobolſky.

I ſet out in the week of *Maſſinitſa*, which is the week before Lent, when the Ruſſians ſeldom travel, on account of the licentiouſneſs of the common people; who are inceſſantly drunk during this ſeaſon, and give themſelves up to all kind of exceſs. The fear of miſſing my obſervation, hindered me from following the advice they gave me, to defer my journey, and indeed I met with nothing diſagreeable from the Ruſſians.

I travelled all night without getting out of my ſledge, ſlept only a little in the morning of the 11th, and arrived about noon the ſame day at Tſchoudowai. Shut up as I was in my ſledge, and covered with furs, I ſtill found it extremely cold. On coming out I went into a ſtove, and was much aſtoniſhed to ſee ſome little children naked, and playing about in the ſnow, in this ſevere weather, while others more grown up were diverting themſelves with drawing four or five of their playfellows in a ſledge. Theſe children are thus inured from their birth to the cold, which does not in the leaſt affect them, although they are every minute expoſed to the change from cold to heat, by going in and out of their ſtoves.

I had every thing neceſſary for dinner brought into the ſtove, and found ſome of my flaſks emptied, and good part

of my proviſions gone. On making ſome inquiries into this matter, one of my guides told me, it was to be laid to their charge; that as for wine they liked it better than brandy, and would drink it. I was the more ſurprized at this declaration, and the poſitive manner in which it was delivered, as I had ſpared no pains to win all theſe people over, and make them attached to me. The idea of travelling alone with perſons I had known only for two days, and who behaved in ſuch a manner, did not allow me to heſitate one moment on the nature of my own behaviour; I therefore gave the fellow who ſaid this to me, ſuch an anſwer, that he was glad to get down ſtairs as faſt as he could. After reflecting a few moments, I was well pleaſed with the end of this affair, and not ſorry that I had ſhewn ſuch ſpirit, as too much diſcretion might have been attended with diſagreeable conſequences upon this occaſion. The Ruſſians of this claſs have no other idea of ſubordination, than that of the moſt abject ſlavery, and acknowledge no maſter who does not treat them with harſhneſs.

On the 13th I came to Gorodnia, a hamlet between Tweer and Klin: as ſoon as I got out of my ſledge, the watchmaker aſked me for one to himſelf; and complained of being too much crouded in the ſledge where he was with my interpreter: beſides that this would have brought on an additional expence, which was quite unneceſſary, the difficulty of getting horſes was a ſufficient reaſon for refuſing to comply with this requeſt, which was the more extraordinary, as the method of travelling in ſledges, however agreeable at the beginning of winter, grows very inconvenient towards the end of this ſeaſon, eſpecially if one perſon is alone in the ſledge. The roads are then all divided by parallel ditches, at the diſtance of about thirteen or fourteen feet from each other, and holes are often met with ſeveral feet deep, in which the ſledges fall; this gives the traveller ſuch violent ſhocks, that he is in the greateſt danger

ger of having his head broken againſt the ſides of the ſledge, unleſs he continues lying along. Notwithſtanding this precaution, the ſhaking is ſo conſiderable, that it is thought much better to have ſeveral perſons together in one ſledge, by which means the ſhocks are leſs dangerous.

I reached Moſco on the 14th at night; my ſledges were broken to pieces with the continual ſhocks they had received, and were in ſuch bad condition that they could not be mended. The Chancellor Woronzof had given me a letter for his brother at Moſco, from whom I received the greateſt kindneſs, as well as from his lady. They are held in the higheſt eſteem in this town; and the reſpect their virtues inſure them, is more pleaſing, than that which is due to their rank. This family is the protector of ſtrangers: ſincerity and good-nature, leſs frequent in Ruſſia than any where elſe, are conſpicuous qualities in them, from the firſt moment they become acquainted.

M. de Woronzof aſſured me, that the thaw would be complete before my arrival at Tobolſky, as I had been already told at St. Peterſburg; in this caſe it would have been impoſſible for me to reach this town time enough to fulfil the deſign I had been ſent out for. I had been four days travelling from St. Peterſburg to Moſco, a journey often performed in two. This delay had been occaſioned by a number of unforeſeen accidents; the firſt cauſe of which was the badneſs of the roads.

The cold, which made my attendants ſtay too long in the ſtoves while the horſes were changing, alſo kept me back. I was then convinced of the reality of the obſtacles which had been foretold to me, and of the impoſſibility of reaching Tobolſky in due time, without altering my plan.

I left the new ſledges I had ordered, and for the ſake of expedition, bought up ſome which belonged to the country people. I recruited my proviſions, which had been much waſted; or rather indeed M. de Woronzof took care to pro-

vide

vide me with moſt of the things I wanted. I ſet out on the 17th in the morning, determined not to ſtop any more; the next day I told the watchmaker and the interpreter, that I would drop them on the road, if ever they went into a ſtove. This declaration, which they knew I ſhould keep to, and the brandy I gave the poſtilions, had the deſired effect; ſo that I met with no other delays, but travelled on in my ſledge with amazing ſwiftneſs. The rivers in the north are very quickly frozen over; their frozen ſurface does not become uneven, as that of the Seine at Paris, but is perfectly ſmooth: the velocity of the ſledges is then ſo great, that as we were upon the river Occa, one of the poſtilions was unable to avoid a hole where the water was not frozen, although he had diſcovered it from the diſtance of more than thirty paces; one horſe fell at once into this hole, and the others, in ſpight of their reſiſtance, and the poſtilion's efforts, would have been dragged in after him, if we had not helped them very ſpeedily, by cutting the cords which faſtened them to the ſledge. There are many ſuch holes to be met with, where the water never freezes, although the ice around is three feet thick, and the cold ſo very ſevere that it will freeze brandy and ſpirit of wine. I have ſeen upon this ſame river an extent of more than 200 feet where the water was not frozen. The readieſt way of accounting for this appearance, is to ſuppoſe that it may be produced by ſome hot ſprings at the bottom of the river: but, on reflection, it will hardly ſeem poſſible that theſe ſprings can be conſiderable enough to cauſe ſuch large openings. Beſides, this river being exceedingly deep, however ſpecifically light theſe waters ariſing from ſprings may be ſuppoſed to be, they would have time to contract a certain degree of coldneſs, in paſſing along a diameter of ſuch length, as that, which reaches from the bottom of the river to its ſurface. The manner in which the congelation of the waters of this river is brought about, ſeems rather

to diſcover to us the natural cauſe of this phenomenon; for, in reality, all the great rivers in the northern countries, as well as in our climates, would never freeze, becauſe of the rapidity of their current, unleſs the ice was firſt formed towards the borders of the river where the waters are more at reſt; theſe flakes of ice, being looſe and floating, grow bigger, and increaſe daily, ſoon covering the ſurface of the waters. In this ſituation the ſeverity of the northern froſt fixes at once all theſe looſe flakes, ſo that they neceſſarily form a ſurface perfectly even; whereas the ſurface of frozen rivers in our temperate climates is always rough, becauſe the cold is not ſufficiently ſevere to bring about this conſolidation ſo ſpeedily.

Admitting that theſe floating pieces of ice are ſo quickly joined together in the northern countries, it may eaſily be conceived that intervals muſt be left between ſome of them, on account of the different figures of theſe flakes. The large opening I have taken notice of, was probably produced in this manner; it was formed in the middle, and in the direction of the current: ſuppoſing therefore the river to be frozen at its borders, while the ice was floating in it, and conſequently its channel much contracted at the ſurface of the water, the large flakes will have formed an obſtacle at this place, will have been fixed there, and have left this large ſpace unfrozen. It will certainly be objected, and with reaſon, that although the ſurface of the water is frozen, the river may have ice floating beneath the frozen ſurface: theſe flakes will then come up to the ſuperficies of the water in the places which are not frozen, fix themſelves there and fill up the empty ſpaces. I imagine it to be really owing to theſe new formed flakes of ice, that ſo few vacant ſpaces are to be found on large rivers; but it certainly does not follow from hence, that every opening left, after the firſt formation of ice, ſhould neceſſarily be filled up; beſides, as ſoon as rivers are frozen over, there are

few

few looſe flakes in them, and theſe, float but for a ſhort time. In our moderate climates, the froſt is very mild compared to what it is in the northern countries, where the thermometer falls as low as twenty or five-and-twenty degrees, and ſometimes even to ſeventy: the temperature of the air varies likewiſe ſo conſiderably in our climates, that ſeveral thaws frequently take place in one winter; ſo that it is not to be wondered at, that there ſhould be ice floating in the rivers moſt part of the time; whereas, the exceſſive hard froſts in northern countries; fixes at once all the looſe flakes of ice; and no new pieces are formed, becauſe the froſt continues without interruption for ſeven or eight months in the year.

I made an obſervation in Siberia, which proves that there is no ice floating in rivers after the firſt moment of their being frozen up, and that the empty ſpaces left towards the current, can never be filled up with ice, during the whole courſe of the winter. In travelling on the Occa, and afterwards on the Volga, I met with ſeveral openings about eighteen inches in diameter: theſe had been made by the country people through the ice, which was more than three feet thick, for the convenience of placing nets to catch fiſh. This cuſtom would not have been eſtabliſhed, or would not certainly have been continued to this time, if there were any floating pieces of ice in theſe rivers; for in that caſe, the nets would ſoon have been carried away. It is evident for the ſame reaſon, that the water cannot freeze in theſe parts; and indeed I have always found it fluid in all the openings where I have ſtopped to examine the fact.

This obſervation, at the ſame time that it ſhews that the motion of current waters is a great impediment to their being congealed, furniſhes alſo an argument in favor of the opinion advanced, by ſome natural philoſophers, that the waters of the ſeas ſituated near the Pole can never be frozen, notwith-

ſtanding the prodigious mountains of ice which float near the borders of theſe ſeas at the end of the winter. Theſe mountains of ice have only been formed near the coaſts, particularly at the mouths of rivers, by the flakes of ice brought down by them at the beginning of the winter: but out at ſea, the water cannot be more frozen than it is at the torrid zone, and the dangers travellers have been expoſed to on theſe ſeas, have ariſen entirely from their not keeping ſufficiently clear of the coaſts.

The accident which gave occaſion to this ſhort digreſſion happened at the diſtance of a few leagues from Nizan-Novogorod, where I arrived on the 20th, at one in the afternoon.

Before I reached this place, I obſerved from my ſledge, that the ſmall chain of mountains on the borders of the river Occa to the ſouth, was compoſed of matter of various colors, diſpoſed in layers. This mountain being perpendicular, the layers became very conſpicuous, and were objects worthy of attention: I ſtopped the ſledge to go and examine them, and was then at the diſtance of twenty werſts from Nizan-Novogorod. The mountain was more than one hundred feet high above the level of the ſtream, and the layers I have mentioned, were not more than thirteen or fourteen feet from the ſame point: I was for a conſiderable time in doubt, whether I ſhould ſatisfy the great deſire I had of examining theſe layers more particularly; for I could not get at them without paſſing over a heap of ſnow forty feet high, gathered up in this ſpot by the winds: this heap, towards the bottom, appeared firm enough to ſupport me; but I was apprehenſive, leſt the ſnow ſhould fall in with me when once I got upon it; I ventured, however, with a hatchet and hammer in my hand, followed by my ſervant, who ſoon left me to myſelf. The heap of ſnow being even with the layers, I took a ſketch of it; I then examined and brought away ſpecimens of the different ſubſtances: I

came

came down however as ſoon as I could; being obliged frequently to change my poſition, becauſe I found myſelf ſinking by imperceptible degrees, ſo that in the ſpace of a few minutes, I was up to the knees in ſnow. Theſe different layers, reſembling at a diſtance a brick-wall, were compoſed of a particular ſpecies of gypſe, which I ſhall ſpeak of under the article of the natural hiſtory of Ruſſia.

Although the winter ſeaſon was nearly at an end, yet I did not find much ſnow in the flat part of the country, becauſe it had certainly been driven from thence by the high winds into places where the current of air was more frequently intercepted. It is for this reaſon, we found ſuch a quantity of it along this mountain; which I followed as far as Nizan-Novogorod, and obſerved in ſeveral parts the ſame ſort of layers already mentioned. As ſoon as I got into this town, I waited upon M. Iſmaelof, the Governor; for whom I had letters from M. de Woronzof, the High Chancellor. This miniſter was not only ſo kind to give me letters of recommendation for every place I was to paſs through; but had alſo given orders before I left St. Peterſburg, that I ſhould be ſupplied with all poſſible accommodations on the road. I ſhould alſo mention, that ſeveral other noblemen had been ſo attentive as to give me letters, containing orders to their ſtewards; from whom I received very great aſſiſtances. If I have ſometimes been in diſagreeable ſituations, this can only be aſcribed to the nature of the climate, and the diſpoſitions of the common people. It is impoſſible to be exempt from ſuch incidents, in countries where the police is beſt regulated; much leſs in Siberia, ſo far diſtant from the inſpection of the ſovereign.

M. Iſmaelof informed me, that there was a Frenchman in this town, whoſe name was Boudet, intruſted with educating the children of one of the principal families: he was well qualified for this employment; and was much eſteemed and

reſpected in this place. He paid me a viſit the ſame day, and conducted me to all the places I was deſirous of ſeeing.

As I ſtopped at Nizan-Novogorod to have my ſledges repaired, I paſſed the whole of the 20th inſtant, in ſeeing the town, which is moſt pleaſantly ſituated, in form of a circle, upon the ſlope of a mountain, at the foot of which runs the river Volga: there is a large plain on the top of this mountain: the ground which is even with the river, is alſo diſpoſed in a plain beyond the Volga, bounded only by the ſight.

This ſtream is the more beautiful at Nizan-Novogorod, as it receives there the river Occa: the Volga is about two and thirty feet deep, and about three hundred and eighteen feet wide, before the Occa runs into it: this river is at leaſt one hundred and thirty-ſeven feet wide. The large ſheet of water formed by the confluence of theſe two rivers, makes a delightful view in ſummer time. The Governor's houſe is ſurrounded with ſtone walls, forming a kind of fortification, which however is not ſtrong; the town is about eight hundred and fifty feet long, including the ſuburbs: it is among the ſecond claſs of Ruſſian towns, with reſpect to its ſize, and very deſervedly reckoned among the firſt, on account of its trade, becauſe it is the mart town of all the corn round about, which makes it very commercial. Seven or eight hundred ſtrangers are to be ſeen there every day in the ſummer time, for the ſpace of four months in the year: notwithſtanding this, the people of the town are not rich, becauſe the greateſt part of the trade is carried on for the ſovereign Prince, whoſe agents are ſo many tyrants; the reſt of this trade belongs to the different noblemen, who ſend their corn to this market, ſo that the town's people have no ſhare in it. There are indeed ſome few woollen-drapers and haberdaſhers in the town, but their ſhops are ill ſtocked, and their goods very bad; the ſhops are in the market, on the borders of the Volga. I met with a great concourſe

of

of people in the market: the proviſions ſold there were chiefly frozen fiſh of different ſorts; they are caught at the beginning of winter, and preſerved 'till the end of this ſeaſon by means of the cold, as well as butcher's meat and game: the people often lay in a ſtock of theſe proviſions for four or five months to come.

The town is as ill-built as it is agreeably ſituated: moſt of the houſes are of wood, very few of brick. There are thirty pariſhes in this town, and five or ſix convents: but there are no more than two or three prieſts to each pariſh, a number indeed more than adequate to the number of pariſhioners. It is cuſtomary among the Ruſſians, to have ſeveral pariſhes in their towns, although they contain but few inhabitants: the number of church men is conſiderably increaſed by this multiplicity of pariſhes.

The young lads in this town, as well as in the neighbouring places, are married at fourteen or fifteen years of age, and the girls at thirteen: the women often breed 'till they are fifty. It will certainly be imagined from this account, that the country muſt be well peopled: but we ſhall find it otherwiſe, and that it is neceſſary to marry the girls early, in order to prevent debauchery.

My ſledges being mended on the 21ſt in the evening, I left this place the ſame day at eight o'clock: the accident I had met with near Nizan-Novogorod, where one of my ſledges had nearly been deſtroyed, although in the day-time, had made me determine not to travel on the rivers in the night. It is then impoſſible to ſee the holes; and we might all have been ſwallowed up, without either of us being able even to warn the others of the approaching danger; the poſtilions, however, aſſured me, that they were acquainted with the dangerous places, and that we ſhould ſhorten our journey much by going along the river. I truſted to their experience, and arrived on the 22d at Kuzmodemianſk, at ſeven in the evening, after travelling

travelling forty-three leagues: the ſurface of the Volga was as ſmooth as glaſs, and not the ſmalleſt riſing to be ſeen on it; the ſnow which had fallen on it had been immediately carried off by the wind, and the ſledges went on with inconceivable ſwiftneſs. I ſometimes got out of my ſledge and placed myſelf behind it, in order to enjoy the pleaſure of travelling ſo quick; the borders of the Volga are well peopled in the courſe of this route, ſo that the pleaſure was heightened by ſeeing the river covered with a number of ſledges croſſing each other, running foul of, and frequently overturning each other, from the extreme rapidity of their motion. Although this was a very amuſing ſight to me, I could not enjoy it long: the ſeverity of the cold, which made the thermometer fall down to eighteen degrees, obliged me to get quickly into my ſledge again; neither could I bear the exceſſive quickneſs of the motion, while I ſtood upright on my ſledge. The horſes in common uſe are very ſmall, and appear weak; but they are inured to labour, and get on extremely faſt, although the poſtilions ſeldom laſh them; they content themſelves with whiſtling to them, and waving their hands, or ſpeaking to them; they call theſe animals, mother, ſiſter, and dearly beloved: one would imagine they are converſing with reaſonable beings. I went ſometimes at the rate of four leagues an hour; but was frequently delayed by the difficulty of getting horſes.

Although I had met with ſeveral inconveniencies in travelling on a ſledge in bad weather, I was convinced by my journey from Nizan-Novogorod to Kuzmodemianſk, that this kind of carriage is extremely pleaſant at the beginning of winter: for I ſat as eaſy in my ſledge on the Volga, as I ſhould have done in a boat in the ſummer time.

Kuzmodemianſk is a pretty large village; the Ruſſians call it a town. I found about fifteen country people aſſembled at the gate, who took my barometer for a clock. One of the country

country people had a chain round his neck, to which was faſtened a log of wood, about two feet and a half long, and eight inches thick: it was intended as a puniſhment, but I could not learn for what fault it was inflicted. At this place, I found all the horſes I wanted; I ſet out immediately, and quitted the courſe of the Volga with regret.

From St. Peterſburg, I had hitherto met with no eminences large enough to be called mountains: this vaſt plain is barren in many places, and cultivated in others: on the reſt, pines and birch trees are only to be found. Having croſſed the Volga at Kuzmodemianſk, I entered into a large foreſt, more than three hundred leagues long: indeed, all the reſt of the road may be looked upon as one continued foreſt, as far as the confines of Tobolſky, from whence I was ſtill near five hundred leagues diſtant.

The woods in this foreſt were of the ſame kinds as thoſe I have before mentioned; but there was a greater quantity of ſnow here: it was more than four feet deep in the woods, while in the open country it was not above two feet deep at moſt. The thermometer ſtill kept up at eighteen or nineteen degrees below o. I was obliged to run the poſts of Bolchaia and Koumia with the ſame horſes: the firſt, is not more than two leagues from Kuzmodemianſk, the ſecond, is two and a half from Bolchaia. As theſe two places were nothing more than hamlets of four or five houſes, I found neither horſes nor poſtilions there; ſo that I was obliged to go on with the ſame as far as Choumetri, where I arrived on the 23d, at ten in the morning. The people of this hamlet had run off into the woods as ſoon as I came; ſo that I was left only with the poſt-maſter; in vain we ſearched over the whole hamlet for horſes: I met with nothing but children in cradles; the mothers and daughters had hid themſelves, for fear they ſhould be made to ſerve as poſtilions. The poſt-maſter had no more than ſix

horſes, according to the regulation, for the uſe of the court meſſengers, and the other horſes were not able to go any farther. Some country people paſſed by in their ſledges: they were ſtopped, and told that their horſes were wanted; inſtead of making any difficulty, they immediately left their ſledges, with every thing that was in them, and eſcaped into the woods: ſome of them however leſs ſwift footed than the reſt were laid hold of. I aſked what was the reaſon of their running away, and of this unuſual confuſion; and was told that moſt travellers made free with the horſes, and with every thing elſe belonging to the inhabitants of theſe hamlets; who are often ill uſed upon aſking for what was their due. The uniform of the ſerjeant who was with me, and the appearance of the reſt of my company, had made them apprehenſive of the ſame kind of treatment; the former poſtilions removed the fears of theſe unfortunate people; and by the help of ſome brandy I gave them, the quiet of the hamlet was again reſtored. Thoſe we had ſtopped, even deſired to go along with me, with ſuch of the former poſtilions as were leaſt fatigued. My journey after this was always towards the north. The cold and the ſnow increaſed daily; and houſes were leſs frequently to be met with; ſo that we were obliged to travel five-and-twenty or thirty leagues with the ſame horſes: the roads were ſo narrow, that there was but juſt room enough for a ſledge, and moreover, ſo ſerpentine, that we were much incommoded by ſtriking perpetually againſt the trees. The holes we likewiſe fell into every inſtant gave us ſuch violent ſhocks, that I was in continual fear leſt the ſledges ſhould be broken to pieces. If I met any other ſledges coming from Siberia, they were laid on one ſide, that mine might paſs by: this is the privilege of thoſe who travel with the royal poſt; a bell faſtened to the firſt horſe, is the diſtinguiſhing mark, and gives notice from afar to clear the way.

The

The firſt place I came to, after leaving Choumetri, was the borough of Carewokokſzaiſk: it is dependant on the Empreſs alone; all inhabitants who are ſubject only to the ſovereign, are much happier than thoſe who are under the dominion of particular noblemen. Theſe individuals have the power of levying taxes, which they almoſt always abuſe. Beſides the claims of the nobleman, the inhabitants pay alſo one rouble (about four ſhillings and ſix pence Engliſh) to the Empreſs. The poſt-maſter's wife, a woman of forty, had had twenty children, two of them only were alive; one of five, the other of four years old; all the reſt had died before they came to that age. Here I ſtopped to get my ſledges mended, and left the place as ſoon as they were ready; the thermometer was ſtill at the ſame height of eighteen or nineteen degrees. At the diſtance of a few werſts from this borough, my ſledge was ſo violently overturned that my laſt barometer was broken. I had not left the foreſt ſince Kuzmodemianſk, and had met with no places free from trees except when I came near the houſes: the wood was either of the pine tree, deal, or birch; theſe trees had been burnt in ſome places by accident, at the diſtance of twenty or thirty leagues. It was then Lent ſeaſon, which the Ruſſians keep very ſtrictly; their food conſiſts of bad black bread, ill made and ill baked, and of oatmeal boiled in water, to which the better ſort of people add ſome oil of hemp-ſeed. Their drink is what they call *quouas*, which is nothing more than water made to ferment with bran and a little flower. This liquor is very fine, and of a yellow colour; but more ſour than vinegar, and has a taſte which perſons who are not uſed to it cannot bear. At other times of the year, their food is chiefly fiſh and ſome *piroquis*: the piroquis are a ſort of ſmall pies, about three inches wide, the inſide of which is filled with a fiſh they call *Siantki*. They eat their meals at a table where they place themſelves round a

bowl full of water-gruel; ſome are ſeated, others ſtand up: ſome old women go about to the houſes at meal-times to ſell the piroquis.

The cottages appear ſo much the more gloomy, as the ſeverity of the winters does not allow of any communication with the external air: the windows are generally no more than one foot high, and ſix inches wide; beſides which, the inhabitants are almoſt deprived of the light of the ſun, all the while that he remains in the weſtern conſtellations: they are then in almoſt continual darkneſs, receiving light only from ſplinters of birch, which they call *louchines*; they firſt dry them on the ſtove, then fix them between the beams, to give light, or place them on a trevet; this is the buſineſs the old people are employed in, as well as in taking care to put freſh ſplinters as the others burn out. This cuſtom prevails all over Ruſſia.

Their houſes are of wood, and not conſtructed with much ſkill; they content themſelves with making notches at the end of each beam, that they may be firmly faſtened one upon another. They take ſo little pains to fit them to each other, that there are large intervals between them, which they fill up with moſs, to keep out the external air. When the building is raiſed from twelve to twenty feet high, they cover it with boards. In houſes where there are two floors, the lower floor is for the cattle, and the upper is divided into two parts, one for the milk and other proviſions, the other for the family. In the laſt is a ſtove, which takes up one fourth of the room: it is generally made of brick, and is like our common ovens, with this difference only, that it is flat, and has no chimney: to ſupply the place of which they uſually make a hole of about ſix inches in the ceiling, which may be opened or ſhut at pleaſure by means of a valve. Notwithſtanding the ſeverity of the winters, they make fires in their ſtoves but once a day, at

ſeven or eight in the morning. As ſoon as the fire is kindled, the room is full of ſmoke; the valve being cloſed ſince the laſt evening, ſuch a quantity of ſmoke is immediately collected that it forms a cloud, which ſupports itſelf at the height of two feet or two and a half above the floor. The people of the houſe muſt then ſit on the floor, or, if they walk, muſt bend themſelves quite forwards, the ſmoke being ſo thick, that any perſon ſtanding upright in it would ſoon be ſuffocated. Strange as this cuſtom may appear, yet there is a reaſon for it. When the ſmoke is diffuſed all around, and ſuffered to remain for any length of time in theſe cottages, the heat is conſiderably increaſed; ſo that as ſoon as the wood is conſumed, and nothing but the embers remain: about three hours after the firſt lighting of the fire, the valve is opened, the ſmoke ſoon diſperſes, and the valve is immediately ſhut again till next day, to prevent any communication with the external air. The heat is then ſo great, that M. de Reaumur's thermometer riſes to thirty-ſix and forty degrees; a heat which is almoſt as unbearable for a ſtranger as the ſevere cold of the external air. A conſiderable degree of heat is preſerved in the cottage even till next day, when the thermometer ſtill keeps up at ſixteen or eighteen degrees above temperate.

The furniture conſiſts chiefly in benches placed round their cottages, ſometimes a ſmall table, and ſome earthen and wooden ware for their victuals, which they dreſs before the ſtove, with the embers remaining after the wood is burnt out. The women are always employed in this buſineſs, while the men build the ſledges, make nets for fiſhing, and other inſtruments for hunting thoſe animals which ſupply the Ruſſians with their beautiful furs.

All theſe inhabitants appear to be ſuperſtitiouſly attached to the Greek church; they are ſo ſtrict with regard to the Lent faſts, that they make children of three or four years old keep

them, and never omit this duty, although they ſhould at the ſame time be engaged in the moſt criminal purſuits.

Each family has a ſmall chapel in the houſe, where the ſaint of the family is placed; they look upon him as the guardian deity of the cottage, and never go in or out of doors, without making ſigns of the croſs for ſeveral minutes, bowing themſelves down at the ſame time, and offering up ſome prayers to the ſaint. I once ſaw one of theſe country people ſtrike his head ſo violently againſt a poſt in the eagerneſs of bending forwards, that he turned quite pale immediately: notwithſtanding which he went on with his prayers. Obſerving that every body was looking at him without offering him any aſſiſtance, I went up to him, and made him ſit down; he found himſelf ſick, but luckily received no other injury from this exceſs of devotion.

The Ruſſians take great care to ornament this chapel with ſmall wax-lights, ſix or ſeven inches high, and about one third of an inch thick. They put other ſmall images into it, eſpecially ſuch as they have received in marriage. The richer people hang up a lamp before the chapel, and on particular days they light up all theſe wax-candles, and leave them burning all night. Several fires happen from their careleſſneſs in neglecting to change the lights before they are quite burnt out; by which the chapel, the ſaint, the cottage, and the whole village, are ſometimes deſtroyed in a few hours. Such accidents are frequent, as this cuſtom prevails all over Ruſſia, even at the palace of the Empreſs.

The Ruſſians have ſo much faith in the ſaints of their chapels, that they always addreſs a ſhort prayer to them before they undertake any thing. I was told by a Ruſſian, who was in love with his neighbour's wife, and encouraged by her, that after having ſuffered a long time from the watchfulneſs of a jealous and troubleſome huſband, he contrived at length to get

get into her chamber: juſt as he thought himſelf upon the point of being completely happy, the lady thinking of her ſaint, ran into the chapel immediately, and made her prayer to him, after which ſhe returned and threw herſelf again into his arms.

On the 25th, at three in the afternoon, I came to Chlinow or Wiatka, a ſmall town on a river of the ſame name, where I ſtopped only while my ſledges were mending. The High Chancellor, M. de Woronzof, had given me a letter to M. Perminof, who was then abſent, but I received many civilities from his lady. I accepted of the invitation ſhe politely gave me to dinner, and went away at eight in the evening. It was ſo dark that M. Perminof ſent ſome of her people with me on horſeback, who rode poſt with lanterns fixed to the end of large ſticks. I ſent them back when I had got a little better than a mile beyond the town, having a flambeau to each ſledge.

All the way from Kuzmodemianſk to Chlinow it was a covered country, being only cleared and cultivated round about the villages. Theſe glades were ſeldom three miles in extent, and generally much leſs. Whenever I got upon any eminence, I ſtopped to take a view of the circumjacent country, but could never ſee any thing but woods; the ſmall, clear, and open places being loſt in the quantity of theſe immenſe foreſts.

At the diſtance of a few werſts, I got into the wood again, where I travelled all night without receiving any hurt, notwithſtanding my ſledges were frequently overturned. On the 26th, at two in the afternoon, I reached the hamlet Troitſkoie, where I was obliged to ſtop till ſix in the evening, for the repairing of one of the ſledges which had received moſt damage in the courſe of the laſt night. I took freſh horſes at this place.

Since

Since my ſetting out from Moſco, which was on the 12th, I had not ſtopped any where except at Nizan-novogorod, where I paſſed one night. I had been in my ſledge moſt part of the reſt of the time, where I had very little reſt, on account of the frequent ſhocks and overthrows I met with. My attendants did not reliſh this kind of life: and as they had no particular point in view to encourage them, they took ſome opportunity every day of ſhewing their diſſatisfaction. I had no ſooner got on a few werſts into the wood, than I fell faſt aſleep: ſome time after I waked, it was ſtill dark night, ſo that I could diſtinguiſh objects only from the clearneſs of the ſnow, much ſhaded by a cloudy ſky. I knew not at firſt whether I was awake or in a dream, where I was, or where I was going; but no ſooner was I rouſed from this ſtate of uncertainty, than I was ſeized with the dreadful idea of being forſaken by my attendants. Getting immediately out of my ſledge, I found myſelf alone: I called out to each perſon by his name, but all was ſilent around me; and as I had ſeen their diſcontent increaſe daily, and overheard ſome of their diſcourſe, I began to fear that this idea was but too ſtrongly confirmed. The horror of my ſituation will eaſily be conceived, when I found myſelf alone in one of the darkeſt nights, at the diſtance of fourteen hundred leagues from my native country, in the midſt of the froſts and ſnows of Siberia, with the images of hunger and thirſt before me, to which I was likely to be expoſed; I was even ignorant whether I was in the beaten track or not, which however did not ſeem probable.

Agitated with theſe thoughts, I replaced myſelf in the ſledge, and got out of it again directly; the minute after I got into it again, ſeized my two piſtols, and followed a track which appeared to preſent itſelf. I ſoon forſook this path, and immediately ſank into the ſnow up to my ſhoulders; I got out again, however, with much difficulty, but ſo exceedingly fatigued,

fatigued, that I continued lying in the ſame poſture proſtrate on the ſnow. After ſome little time I ſat myſelf down, felt for my piſtols, and found they were ſtill buried in the ſnow. I was convinced, on looking round me, that I was ſtill in the ſame track, and got back to my ſledge. I was ſtill in ſuch agitations that I could not ſtay there long, but threw myſelf again into the ſame path; warned by the laſt accident, I proceeded with great caution, went on more ſlowly, and was the more uneaſy at being forced to walk ſuch a pace. I went backwards and forwards in this manner great part of the night, my thoughts always employed on my ſituation, and coming back now and then to my ſledge. Although I was expoſed to the moſt ſevere cold, I was ſtill in a profuſe ſweat, notwithſtanding I did not walk much; at laſt, purſuing the ſame track again, I perceived a glimmering light at ſome diſtance; on drawing near I diſcovered it to be a houſe. I went in immediately, and found my people there faſt aſleep; they were lying on the ground by the ſide of ſome young girls; they ſeemed all to be in great want of reſt; I rouzed my ſervant, however, and left the houſe as quick as I could, for I was unwilling they ſhould diſcover how rejoiced I was at finding them again. A light was ſoon brought, and I found they had left the other ſledges at the bottom of the village, and brought up mine a little above it. They told me afterwards, that being much oppreſſed with fatigue, and ſeeing me aſleep, they had been willing to reſt themſelves a little, but that being drawn in by the beauty of theſe young girls, the eldeſt of whom was not above ſeventeen years of age, they had ſtopped longer than they intended. It was evident that I was obliged to put up with this affair. Having found my piſtols again, I ſet out at ſeven in the morning with the ſame horſes. I paſſed by Volva, and arrived on the 28th at Berezowka, a hamlet ſituated in the thickeſt part of the foreſt. As it conſiſted only of three houſes,

houſes, inhabited by poor people, I could get no horſes there; and was therefore obliged to take the ſame on to Jouſſinewſkoe, which made five and twenty leagues, in exceeding bad roads. I found however that I had gone on at the rate of two leagues in the hour. I met with very few dwelling places in the courſe of theſe five and twenty leagues; and theſe hardly deſerved to be called ſo from the ſcarcity of inhabitants, and their extreme poverty. I continued travelling in the ſame foreſt, which grew more thick as I advanced. The roads were ſo narrow, that the ſledges we met going the other way were more inconvenient here than any where elſe. There was ſuch a prodigious quantity of ſnow, that great caution was required in laying the ſledges down on one ſide: nothing but the heads of the horſes, turned out of the road to give room for my ſledges to paſs, were then to be ſeen. In one of theſe occaſions, as we were paſſing too ſwiftly by one of theſe ſledges thus laid on the ſide, the top of mine ſtruck againſt the ſhaft of the other, and was carried away with ſo much force, that I ſhould certainly have been killed, if the ſtroke had lighted upon me. This laſt ſhock completed the deſtruction of my ſledge: I now remained without any covering, expoſed to the ſeverity of the cold air. Being at no great diſtance from Solikamſky, where I foreſaw that I ſhould be obliged to take new ſledges, I did not chuſe to ſtop at Jouſſinewſkoe to get my own mended: the reſt of the ſledges were alſo much broken. I continued my journey, but was now thrown out at a conſiderable diſtance in the middle of the ſnow, whenever the ſledge was overturned. At length I came to Solikamſky on the 29th, at eight o'clock in the evening, after having travelled one hundred and eighty werſts in this wretched condition. Not having been into a ſtove ſince the 18th of the month, and therefore not having eat of any thing but what was frozen, except at Chlinow, I was the more affected with

with the fatigue. When I came to Solikamſky I went to Mr. Dimidof's office; he had given me a letter for his ſecretaries, and had ſent them previous notice of my arrival. I was informed that they lived at the diſtance of a mile from the place, and the people offered to conduct me; but I was ſo exceedingly tired that I could not poſſibly go any farther. I had my matraſs brought immediately and laid myſelf down, but reſted very little; I felt the moſt acute pains in all my limbs, and had a cold beſides, which prevented me from ſpeaking. As ſoon as it was day-light, I was told that Mr. Dimidof's ſteward had ſent ſeveral ſledges for myſelf and my attendants, and ſome horſes to convey my baggage.

I roſe and went immediately to the houſe, where I was received by Mrs. ***, (whoſe name is not to be found in my journal) who told me, by my interpreter, that ſhe had orders from her maſter to receive me as if he was there himſelf; that ſhe deſired I would look upon the houſe as my own, and that I could give her no greater ſatisfaction than in diſpoſing of every thing in it as I pleaſed. I thanked her for her attention, then had my ſledges unladen, and ſent for ſomebody to mend them. I was obliged to give them all up, except the one which carried the baggage, and which was ſtill capable of being repaired. I was then told that my ſledges could not be ready in leſs than three days. The thermometer being at ten or eleven degrees below 0, and the country ſtill covered with ſnow, there was not the leaſt appearance of a thaw. I was not therefore uneaſy at being detained here, eſpecially as I was no more than about one hundred and fifty leagues diſtant from Tobolſky.

Mr. Dimidof's houſe is ſituated on a ſmall mountain bordering the eaſtern ſhore of the river Kama: the natural beauty of the ſituation is heightened as much as poſſible by all the embelliſhments of art, liberally beſtowed on the building,

which is of wood, as well as on the garden, which is very extenſive. As the garden cannot well be kept up in winter, on account of the ſeverity of the ſeaſon, Mr. Dimidof has provided twelve very beautiful green-houſes; theſe were full of orange and lemon trees, and contained likewiſe all the other fruits of France and Italy, with a variety of plants and ſhrubs of different countries. Theſe were the only green-houſes I had met with ſince I left Moſco; but they are common in this laſt town, in St. Peterſburg, and in the neighbouring places. Without the help of green-houſes theſe towns could not be ſupplied with any kinds of vegetables during the greateſt part of the year, on account of the long continuance of the winter.

Mr. Dimidof had alſo taken care to have an apothecary's ſhop in his houſe very well ſtocked, and kept in excellent order; the direction of it was given to a man of ſkill, who diſtributed the medicines to all the ſick in the place.

The gardener was a Ruſſian, who had ſome notions of natural philoſophy, beyond what his buſineſs required; theſe notions did not indeed beſpeak a man of ſcience ſo much, as one, of an excellent capacity for acquiring knowledge. Mr. Dimidof was himſelf too intelligent not to take notice of his gardener's talents: and accordingly he had ſupplied him with ſome books of mathematics, natural philoſophy, botany, and with all ſorts of inſtruments.

The ſtay I made at Solikamſky enabled me to replace the barometer I had loſt on the road at a little diſtance from Cazan; I made two of them, and gave one to the gardener who had not any: he received it with much joy and thankfulneſs.

Solikamſky is a ſmall town on the borders of the river Kama. Iſbrants Ides, a Muſcovite ambaſſador, gives ſo high a deſcription of this place, in his journey from Moſco to

China*, that I determined to take a particular view of it. I roſe very early in the morning on the 31ſt inſtant, in order to go into the bath, which I had been deſired to do the evening before. As ſoon as I was up, they came and told me the baths were ready, as well as the ſledge on which I was to go. I wrapped myſelf up in my fur night-gown, took my ſervant with me, and was conducted to the baths; the cold was ſo ſharp, that I haſtened acroſs a ſmall antichamber to a door, which I opened, thinking it led to the baths. There came out immediately ſuch a ſuffocating volley of ſmoke, that I ran back again to the door as faſt as poſſible, imagining the bath was on fire. Obſerving the Ruſſians were as much diſconcerted at my going back as I was at the circumſtance, and at their aſtoniſhment, I aſked my ſervant the reaſon of it: he told me, thoſe were the baths, and that I was to undreſs and go into them. A Ruſſian then opened the door again, and went in with his clothes on. I found this ſmoke was nothing more than the vapour riſing from the baths, which formed an exceeding thick miſt, and preſently became ſnow from the extreme cold. The great heat however I found in theſe baths, did not agree with the notion I had that they were only to be uſed for cleanlineſs. I knew not they were intended for ſweating, till I had aſked ſeveral other queſtions, and being ſatisfied with the ſtate of my health, was going away immediately, if my ſervant had not ſtopped me, and acquainted me that the baths had been all night preparing, and that the people of the houſe would be very much diſappointed, if I ſhould decline going into them. Prompted by theſe reaſons, and by my own curioſity, I reſolved to bathe; I therefore had the door opened, and bore at once all the heat. I undreſſed quickly, and found myſelf in a ſmall ſquare room, ſo much heated by a ſtove that I was inſtantly in

* Recueil des Voyages au Nord, tom. viii. pag. 9. in 12mo, edition d'Amſterdam.

a profuſe ſweat. On one ſide of the ſtove there was a kind of wooden bedſtead, raiſed about four feet; there were ſome ſteps to get up to it: the atmoſphere is exceedingly heated towards the upper part of the apartment, on account of the lightneſs of the particles of heat, while the floor keeps much cooler, ſo that theſe ſteps are contrived to prepare gradually for the degree of heat one is to experience on the bed. Being unacquainted with theſe circumſtances, and in a great hurry to get out of the bath, I went immediately and placed myſelf in the higheſt part of the room.

Here the floor had got ſuch a degree of heat, that I could ſcarcely bear the pain I felt in the ſoles of my feet, and could not have ſtaid here, if they had not thrown ſome cold water upon the ſpot, which evaporated almoſt inſtantaneouſly. I took my thermometer in with me, which in a few minutes roſe to ſixty degrees. This prodigious heat preſently ſeized my head, and made me very ſick. My ſervant, who pretended to be much uſed to theſe baths, adviſed me to ſit down, aſſuring me this giddineſs would ſoon go off; but having taken his advice, I felt ſuch acute pain that I thought I was ſitting on a plate of red hot iron. I had not time to conſider what gave me this pain, nor to find the ſteps, but fell in an inſtant at the foot of the bed, my thermometer breaking to pieces with the fall. The heat being much leſs on this flooring, I lay there at firſt without daring to ſtir, and ordered the door and the little windows to be opened directly. There was a tub of water and ſome baſons near me; I had one of them filled, and ſat down in it, while with the other I made them throw water all over me. Being a little recovered, I thought of nothing but getting out as faſt as I could, yet did not dare ſtand upright, becauſe I ſhould then have been in the hotteſt part of the atmoſphere. Attempting therefore to put on my clothes with my body bent, while I was wet, and in too great a hurry,

hurry, I found them too little for me, and the more eager I was, the leſs able was I to get them on. Overpowered with all theſe difficulties, I threw myſelf into the antichamber almoſt naked, where again the extreme cold prevented me from ſtaying to dreſs, ſo that I wrapped myſelf up in my fur nightgown, ran to my carriage, dragging ſome of my clothes after me, and ordered them to drive home as faſt as poſſible, where I went to bed immediately. The miſtreſs of the houſe was afraid, from the condition I came back in, and from my returning ſo ſoon, that ſome accident had happened to me: ſhe came directly to ſee me, I removed her fears, and deſired I might be permitted to take ſome reſt, as that was the only medicine I wanted: ſhe left me, and returned ſoon after with a baſon of tea, which ſhe offered me. Obſerving that I did not care to accept of it, ſhe gave me to underſtand by the Ruſſian ſerjeant, who began to know a little of French, that I had not ſtayed long enough at the baths to have been ſufficiently ſweated; and that it was neceſſary I ſhould drink the tea to promote perſpiration.

Although it was by no means my intention to be ſweated, yet ſhe perſiſted in offering me the tea with ſo much kindneſs, that I took it; but as ſhe promiſed to bring me another baſon in a few minutes, I roſe as ſoon as ſhe left me. My ſervant had ſtayed at the baths, but not finding him returned in half an hour, I was going to inquire after him, taking it for granted ſome accident had befallen him. He came in juſt as I was ſending a man away for him; he threw himſelf directly on his bed without ſaying a word, at laſt he told me, after I had made him ſeveral queſtions, that he had been taken ill at the baths, and would have perſuaded me that he was ſo ill, it was impoſſible he ſhould get over it. As he was uſed to theſe baths, I judged that his indiſpoſition might ariſe from ſome unwholeſome vapours, and as a change of air is the quickeſt

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and moſt efficacious remedy in ſuch caſes; I therefore had all the windows opened, giving orders that he ſhould be kept quiet; and in two hours after he was perfectly recovered.

This firſt trial put me ſo much out of conceit with the Ruſſian baths, that I would not venture into them again during my five months ſtay at Tobolſky, although I was frequently importuned on this point. However my curioſity was ſo much raiſed by what I learned in this town, and through the reſt of my journey, of the advantages of theſe baths, and the method of uſing them, that I tried again at Echaterinenburg, on my return from Tobolſky; but the heat was too much for me to bear. Yet as I was unwilling to leave the country without being convinced by my own experience of what had been reported to me concerning theſe baths, I went into them again at a private houſe in St. Peterſburg, two months before I ſet out for France.

Theſe baths are in uſe all over Ruſſia; every inhabitant of this vaſt tract of land, from the ſovereign to the meaneſt ſubject, bathes twice a week, and in the ſame manner. Every individual, even of the ſmalleſt fortune, has a private bath in his own houſe, in which the father, mother, and children ſometimes bathe all together. The lower ſort of people go to the public baths, of which there is generally one for the men, and another for the women; they are ſeparated from each other by wooden partitions; but as they come out of the baths quite naked, the two ſexes are ſeen by each other in this condition, and often converſe together in this poſture upon indifferent ſubjects; they afterwards throw themſelves promiſcuouſly into the water, or among the ſnow. In poor and lonely hamlets, the two ſexes are oftentimes all together in the ſame bath. At the ſalt-houſes in Solikamſky I ſaw ſome men bathing, who came to the door now and then to cool themſelves, and ſtood there quite naked, talking with women, who were moſt of them employed

employed in bringing ſalt proviſions, brandy, or *quouas*, to the workmen. The baths of the rich differ only from thoſe of the poor people in being more clean; the bathing room is generally all wood; it contains a ſtove, ſome tubs full of water, and a kind of amphitheatre, with ſeveral ſteps leading up to it. There are two openings to the ſtove like thoſe that are in common ovens; by the lower opening the wood is put into the ſtove, the other contains a heap of ſtones ſupported by iron bars; theſe ſtones are always red hot, from the heat of the fire kept up in the ſtove; the uſe of them will appear hereafter. On going into the bath a perſon provides himſelf with a bundle of twigs, a ſmall pail of ſeven or eight inches in diameter, filled with water, and places himſelf on the firſt or ſecond ſtep. Although the heat is leſs here than in any other part, yet it ſoon throws him into a ſweat, the pail of water is then emptied over his head, ſome little time after a ſecond, and then a third. He then mounts a little higher, where the ſame proceſs is repeated, and at laſt he gets up to the amphitheatre, where the greateſt heat is felt. He ſtays here one quarter, or about half an hour, and in this ſpace of time warm water is frequently poured on his body. A man, who ſtands before the ſtove, throws now and then ſome water on the red hot ſtones: volleys of ſteam immediately ruſh out of the ſtove with a noiſe; theſe aſcend to the cieling, and fall down again on the amphitheatre, in a kind of cloud, carrying a burning heat along with it. At this time the twigs are uſed, after they have been made very ſoft, by holding them in the ſteam as it comes out of the ſtove; the man who is bathing then lies down on the amphitheatre, and the perſon next to him whips him with the twigs, expecting he will return the good office: but in many baths women are employed for this purpoſe. While the leaves remain on the twigs, a conſiderable quantity of the ſteam is collected by a turn of the hand; this

ſteam

ſteam acts the more powerfully, as the pores are very open; and that theſe burning vapours are briſkly driven in by the twigs, which are continually applied to all the parts of the body.

In the private baths I uſed, I felt ſuch a ſuffocating heat on my face, when the clouds of ſteam were collected by the twigs, that I could not have ſupported it, had it laſted any time. Being willing to aſcertain the degree of heat brought on by this proceſs, I had it repeated on the thermometer, which however did not riſe more than three degrees higher than it was before.

After having been flogged, water was thrown on me, and I was rubbed with ſoap; a perſon then taking hold of the twigs at both ends, rubbed me down ſo violently, that he was ſoon in as profuſe a ſweat as myſelf. Water was again poured on my body, and on the ſtones, and they were preparing to flog me again; but the twigs having loſt their leaves, I ſprang up ſo ſuddenly at the firſt ſtroke, that I puſhed the operator down the ſtairs on the floor; and determined not to be flogged or rubbed any longer. In a few minutes my ſkin was all as red as ſcarlet. I could not bear to ſtay on the amphitheatre, but had my thermometer carried there, which roſe to fifty degrees, while it ſtood at five and forty in the place where I was: I got out of theſe baths as ſoon as I could.

The Ruſſians ſtay in them ſometimes above two hours, and go through all the aforementioned operations ſeveral times: moſt of them rub their body beſides with onions, in order to ſweat more profuſely; they get out of theſe baths all in a ſweat, and immediately throw themſelves and roll in the ſnow in the moſt ſevere ſeaſons, paſſing thus almoſt in the ſame inſtant from a heat of fifty or ſixty degrees, to a cold of more than twenty degrees, without feeling any inconvenience.

People

People of the firſt rank in Ruſſia go to bed on coming out of the baths, and reſt for ſome time. It is a received opinion that the baths are more beneficial to the common people, who paſs immediately from this intenſe heat to the extreme cold, than to thoſe, who go to bed after them.

All the Ruſſians, in general, are much addicted to the ſcurvy; the languid and inactive life they lead, being ſhut up in their ſtoves all the winter, makes them very full of humors, and they perſpire very little. Theſe baths ſeem therefore to be abſolutely neceſſary for them, as they might be liable to a great number of diſeaſes if they did not uſe them. They produce a great fermentation in the blood and humors, and bring on plentiful diſcharges by perſpiration. The extreme cold drives the humors back from the ſkin, and reſtores the equilibrium again. Whether theſe concluſions are juſt or not, it is an undoubted fact, that theſe baths are very ſalutary in Ruſſia: they would certainly be very uſeful in Europe alſo for a variety of diſorders, eſpecially for rheumatic complaints. Diſtempers of this kind are hardly known in Ruſſia, and many foreigners have been radically cured of them by the uſe of theſe baths.

I went to ſee the braſs foundery and the ſalt-pits the day before I quitted Solikamſky; the foundery is ſituated on the ſmall brook Talitza, at the diſtance of two werſts from the town; it conſiſts of three furnaces, one of which only is in good order. It was my deſign to pay a viſit to Mr. Tourchemin, who has the direction of the foundery, but he was abſent. I aſked for his deputy, who was not to be found, although we went all about the buildings in queſt of him. I therefore returned to the foundery, deſirous of gaining ſome information on different points; and for that purpoſe addreſſed myſelf to ſome of the workmen who appeared the moſt ſenſible, but could not, even with the aſſiſtance of my interpreter, either

underſtand them, or make them comprehend me. At length the deputy came, but was much out of humor; he took a ſhovel and went to work; I went up and bowed to him, ſignifying by my interpreter, how ſorry I was to have miſſed of him, and begging the favor of him at the ſame time to ſhew me the mines: "They are in the middle of the yard," ſays he, turning his back upon me. This abrupt ſpeech did not give me any great inclination to converſe any longer with the deputy. I ſaw however all the mines, and brought away ſpecimens from each, of which I ſhall give an account when I come to ſpeak of the ores. The deputy, in other reſpects, appeared to know very well what he was about, if one could judge from the good order and regularity in which the foundery was kept. He had a ſenſible and ſprightly look; and ſeemed to want nothing, but to have lived leſs among bears, to have been more converſant with men, and to have been born in a free country. I obſerved throughout the whole courſe of my journey, that whenever I had no letters of recommendation to the perſons preſiding over any of the manufactures, I always met with ſuch kind of behaviour as I had experienced on this occaſion; but on the contrary, with numberleſs civilities whenever I had ſuch letters. Theſe ſort of people are ſlaves to a deſpotic ſuperior; they are generally ignorant and exceſſively miſtruſtful, ſo that their behaviour is by no means a matter of aſtoniſhment.

At a little diſtance from the foundery is a manufacture, where moſt of the braſs, coming from thence, is uſed in making houſhold utenſils, ſnuff-boxes, and other works of the like kind, which are of the coarſeſt workmanſhip. I ſtayed but a little while at this manufacture, and met with as bad a reception there as at the foundery.

There are ſalt-ſprings in abundance about this town; they ſay upwards of ſixty. Notwithſtanding this great number of ſprings,

there

there are not more than two boilers in uſe; the firſt forms a ſquare of about thirty feet wide and two feet deep; the other is ſomewhat larger *.

Theſe two boilers are placed in different ſalterns or boiling-houſes, at the diſtance of fifty toiſes from the origin of the ſprings; the ſalt water is raiſed into a reſervoir by pumps, which are ſet a going by horſes; the waters are afterwards conveyed to the ſalterns where the boilers are, through leaden pipes, ſupported by props of wood. All theſe buildings were in a moſt ruinous condition; at which I was the more ſurprized, as they are made of wood, which is common enough in this country. The produce of theſe ſalterns ſeems to be more attended to, than keeping them in repair.

One boiling is finiſhed in eight and forty hours; it commonly produces fifty ſacks of ſalt, and the ſack contains four *poedes* †; ſo that each boiling yields two hundred *poedes*, or ſixty-ſix French quintals. Suppoſing then one hundred and eighty-two boilings in the year, and that the *poede* of ſalt ſells for fifty *copecs* ‡, this boiler will bring an annual revenue of

* According to Mr. Iſbrants-Ides's account, tom. viii. *du Recueil des Voyages du Nord, pag.* 9. Solikamſky is a large commercial town, particularly famous for its ſalterns, in which there are fifty boilers uſed every year, the leaſt of which is ten toiſes deep. A great quantity of ſalt is made there, which is carried away on large ſhips kept only for this purpoſe. Theſe ſalterns are ſixteen or eighteen toiſes in length, there are ſeven or eight hundred men employed in them, and they produce one hundred, or one hundred and twenty thouſand *poedes*; that is, eight hundred, or one thouſand tuns of ſalt.

Perhaps the number of boilers was formerly more conſiderable: but it is abſurd to ſuppoſe them ten toiſes deep. There is no river at Solikamſky capable of ſupplying a building which would contain one thouſand tuns, and it is impoſſible that eight hundred men ſhould have been employed there in making the ſalt. The Kama at this place is a little wider than the Seine at high water. The ſame kind of boats are uſed here as at Paris, excepting only that they are rather longer.

† One *poede* is equal to forty pounds weight of Ruſſia, and to three and thirty French pounds.

‡ One *copec* is equal to about one halfpenny Engliſh, or one penny French.

eighteen thouſand two hundred roubles, or ninety-one thouſand livres of France, the product of twelve thouſand and twelve French quintals of ſalt.

There are now but ſix men employed to each boiler, formerly there were ten: the firſt workman is allowed thirteen copecs per day; of the other five ſome have ten, others eight: reckoning them one with another at nine, the expence for the workmen will amount to fifty-eight copecs *per* day, and to two hundred and eleven roubles *per annum*.

Ten ſquare or ſuperficial toiſes of wood are conſumed at each boiling (the toiſe is equal to three *arcins* and a half); each ſquare toiſe of wood coſts thirty copecs, and the ten toiſes three roubles; ſo that the annual expence for wood amounts to five hundred and forty-ſix roubles.

Each ſaltern employs five or ſix horſes: let us ſuppoſe five upon an average, each of which coſts twenty copecs a day; the yearly expence for keeping the horſes will then amount to three hundred and ſixty-five roubles: let us then allow ſix other men to take care of the horſes, and the pumps, at ſix copecs a day. Although, from the bad condition the ſalterns are in, it is evident hardly any thing is laid out for repairs, yet I will reckon two hundred roubles for this purpoſe. The buying of the horſes at firſt coſts about ſeven or eight roubles, and as deaths do not happen among them every year, this expence can never amount to ten roubles *per annum*. Let us even allow one hundred roubles, including the charges of harneſs, and in this caſe, the whole annual expence for the working of theſe ſalterns cannot exceed ſixteen hundred roubles, or eight thouſand French livres. The produce is eighteen thouſand two hundred roubles, or ninety-one thouſand French livres. The clear produce therefore of the firſt boiler will be ſixteen thouſand ſix hundred roubles, or fourſcore thouſand French livres; and the profits ariſing from the two boilers will be more than

thirty-

thirty-three thouſand roubles, or one hundred and ſixty-ſix thouſand French livres. The direction of theſe ſalterns is undertaken by Mr. Tourchemin; the late Mr. Showalow had it in 1762. The remainder of the profits, after theſe two gentlemen are paid, belongs to the Empreſs. On aſking why two boilers only were in uſe, I was told, that there began to be a ſcarcity of wood, which is brought by the river Kama from the diſtance of fifty *werſts* or twelve leagues.

I found ſome of the people bathing at theſe ſalterns, in the ſame manner as I have deſcribed in ſpeaking of common baths. After being in the baths ſome time, they came out quite naked, and although they were in a ſweat, went immediately and rolled themſelves in the ſnow.

As there was nothing of any conſequence in this ſmall town of Solikamſky, beſides theſe ſalterns and the founderies, I left it on the ſecond of April, at three in the afternoon, much pleaſed with the civilities I had met with from Mr. Dimidof's people. I ſoon came to the mountains called *Poias*, or *Poias Zemnoi:* they form a chain which muſt be conſidered as a branch of the large chain from Mount Caucaſus. The ridge of the *Poias* mountains begins in the ſouth, and divides Aſia from Europe, reaching as far as the frozen ſea. The mountains of this chain are very ſmall, not being in general more than fifty or fourſcore toiſes high; but the aſcents are very ſteep: they are all covered with pines, birch, and fir trees. The roads were dreadful, and ſo much the more dangerous, as the nights were ſo exceedingly dark, that I was every inſtant liable to be ſwallowed up in the ſnow, which readily gave way. If, by chance, I happened to deviate in the leaſt from the beaten track, I was expoſed to very great danger. My attendants and the poſtilions adviſed me not to travel by night; but the wind being changed to the ſouth, the froſt had ſlackened ſuddenly: the thermometer was not more than two

degrees

degrees below the freezing point, and roſe in the afternoon to more than three degrees above it, which made me apprehend a thaw, although ſuch a change was not indicated by any other circumſtance. Fir-trees of the greateſt height ſeemed to yield under the weight of the ſnow, which was every where more than ſeven feet thick on the ſurface of the ground. No bird appeared to give notice of any change of the ſeaſon: even magpyes and rooks, which are met with in great numbers on the roads all over Ruſſia, had now quitted theſe deſerts, where nature ſeemed to have become quite torpid. The marks of the ſledges were the only ſigns of theſe parts being inhabited. A melancholy gloom prevailed all around, and the ſtillneſs was interrupted only by the cries of ſome one of our company calling out for help, when his ſledge was overturned.

The inhabitants are ſhut up in their cottages nine months in the year, hardly ever going out as long as the winter laſts. In the beginning of September the ſnow is to be ſeen on theſe mountains, and ſoon after falls in ſuch abundance, that every ſign of an inhabited place ſoon diſappears.

The people are then obliged to make themſelves a paſſage through heaps of ſnow, collected by the winds among theſe mountains, where the thaw does not begin ſo ſoon as on the plains: for among the mountains it does not take place till towards the end of April, and the ſnow does not entirely diſappear before the latter end of May; ſo that the delights of the ſummer ſeaſon are not experienced here longer than about three months. In this ſhort ſpace of time, however, the inhabitants ſow their rye, oats, and barley, and ſome peaſe, which are gathered towards the latter end of Auguſt; but theſe ſeeds ſeldom come to their real perfection. The ſoil in theſe mountains is dunged.

I came to Roſteſs on the 3d inſtant at midnight, exceedingly fatigued with the ſhocks my ſledge had received, and the

continual overthrows I had met with. Not finding freſh horſes at this place, I was obliged to go on with the ſame. I travelled very ſlowly, on account of the declivity of the mountains we had to paſs. On the 4th inſtant, at half an hour paſt nine in the morning, I was on the top of the higheſt of all theſe mountains; which, however, was not more than fourſcore toiſes above its baſe. But although the height of theſe mountains is not very conſiderable with reſpect to the ground they ſtand upon, they are much higher with reſpect to the level of the ſea, becauſe the ground is conſiderably raiſed. When I meaſured this mountain, I was very near Paiadinſka, where I arrived on the 4th at noon, and ſet out from thence immediately. I croſſed the rivulet of Padira, where there is an iron foundery called Spaſkoe. The ore is brought from the neighbourhood of Verkaturia. I was told in this hamlet that a woman had been devoured there by a bear at the beginning of the winter. Such accidents ſeldom happen, although among theſe mountains there are many bears, which are all black. Theſe animals hide themſelves in caverns as the winter comes on, or under old and very thick firs, where they remain during all this ſeaſon without food.

At the end of the winter the inhabitants go a bear-hunting; they uſe rackets to walk upon the ſnow with; they arm themſelves with pikes, and take little dogs along with them, to provoke the animal. They then wait till he comes out of his encloſure, for they would attack him to great diſadvantage while he remained there, becauſe the ſnow being very firm in that place, the bear would be able to avail himſelf of all his ſtrength; but the inſtant he comes out, he ſinks into the ſnow, and while he is endeavouring to diſengage himſelf, the hunters eaſily deſtroy him with their pikes. The ſkin and fat of this animal are the only parts they reap any profit from. This account was given me at Spaſkoe, and the truth of it confirmed

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at Tobolſky, where I was alſo informed of the manner of hunting white bears, which I ſhall ſpeak of preſently. In the foreſts of theſe mountains there are a great number of wolves, foxes, hares, ſquirrels, and different kinds of fallow deer; but there are no white bears, which are only to be found more to the northward, on the borders of the frozen ocean, but their ſkins are brought all over Siberia. I have ſeen three of theſe animals alive at St. Peterſburg; they are exceedingly fierce. Thoſe I ſaw in this city were chained to a ſtake in the middle of a yard; their litter conſiſted of nothing more than a layer of ice five or ſix inches thick, formed by their excrements and the melted ſnow. This animal is much leſs bulky and more active than the black bear; his ſhape is longer and better proportioned, and his ſnout more elongated: any one may be convinced, by looking at him, of his being capable of running with great ſpeed; and the hunters have availed themſelves of this very circumſtance, in finding out how to kill him with more facility, which, however, requires a great ſhare of intrepidity. I was informed at Tobolſky, and I have no other authority for the fact, that the inhabitants go out a hunting theſe animals armed only with a ſingle pike. They are to be found near the frozen ocean, where the ſnow is as hard as the ground. They run upon the men with ſo much ſwiftneſs, that the huntſman has but juſt time to turn himſelf half round to avoid him, while at the ſame inſtant he pierces the bear with his pike.

I reached Melechina the ſame day, ſo fatigued that I reſolved to ſtay there a part of the night. I knocked at the firſt door I came to, where I waited ſome time, as every body was gone to bed; a Ruſſian came at laſt to open the door, with his lighted piece of wood in one hand, and his cap in the other. His face was ſcarce to be diſtinguiſhed on account of his looſe hair, and a long beard, which came down to his breaſt. The

firſt

firſt object my eyes were directed to on coming in, was an old woman, who had fallen aſleep as ſhe was rocking a child ſlung in a baſket; her ſkin was wrinkled and her complexion darkened by the ſmoke, ſo that ſhe was a very diſagreeable figure. Her garb contributed to make her ſtill more hideous. Upon a bench near her, there was a young woman, who ſeemed more intent upon ſatisfying her curioſity, than anxious to cover herſelf with her ſhift, which was the only thing ſhe had on. The looſeneſs of this covering, and the attitude ſhe was in, left her much expoſed; and her ſkin, moſt delicately white, appeared ſtill more beautiful, from the contraſt of the old woman, who was cloſe to her. Near the bench were two little children lying on the ground, and ſome young calves in a ſtable: the reſt of the family were laid indiſcriminately in the ſtove, and in a kind of loft; ſome were aſleep, and the reſt were as much aſtoniſhed at ſeeing me in their hut, as I was ſurprized at their ſituation and appearance.

The child in the baſket was not a month old; he ſlept among a heap of ſtraw, covered with linen, becauſe he was newly born. Except juſt at this time, children are generally naked in Siberia, as well as all over Ruſſia: they move their hands and feet about freely in the baſket, without being wrapped up. This baſket is faſtened to a long elaſtic pole, which is eaſily moved with the foot, in order to rock them. The women, who have this care, employ themſelves at the ſame time in ſpinning hemp. The children are fed with the milk of animals, by means of a horn, the end of which is fitted to receive the cow's udder: they are however ſometimes ſuckled by the mothers. Theſe children, although ſtill very weak, are allowed to roll on the ground; on which they tumble over head and ears, and attempt to walk. They are left to ſtruggle by themſelves, although they are moſt commonly naked, or have no more covering than a ſhirt. In a few months they

begin to walk, at a time when they would not be able to ſtand up in France. Soon after they run about every where and play in the ſnow. Theſe people are happily unacquainted with the uſe of ſtays, and that quantity of cloaths and confining bandages, we are here ſo anxious to wrap up our children in; theſe not only impede the growth of the muſcles, but at the ſame time bring on deformities, which, on this account, are frequent in all other European nations, while they are ſeldom ſeen in Ruſſia. By this kind of management the Ruſſians are not ſubject to ſo many infirmities, and would live longer than any other ſet of men, if they were not ſo much addicted to debauchery and exceſſes of all kinds. They are ſo much inured to hard living, that although I deſired the ſoldiers who attended me at Tobolſky to lie down in my obſervatory, while I was taking my obſervations, they choſe rather to paſs the night on the graſs, and roſe in the morning with their cloaths almoſt as wet by the dew, as if they had been dipped in water. They ſlept however extremely ſound, and never felt any inconvenience from this circumſtance. Their whole life, and all their exerciſes, bring on ſuch a ſtrength of conſtitution, as enables them to bear the greateſt fatigues in war time, without injury to their health.

The moral conduct of the inhabitants is conſiderably influenced by this kind of life: violent paſſions often contribute to form great men, and are generally attendant on ſtrong conſtitutions. What advantages might we not then expect, if the Ruſſian method of educating was adopted by a nation where the nature of the government, and the moral principles inſtilled into young minds, direct them equally to what is honourable, glorious, and reſolute? Theſe advantages would be the more conſpicuous, as luxury and effeminacy concur with

with the ordinary method of bringing up children, in deſtroying all the principles of this moral education.

It muſt be owned, however, that prejudices with regard to theſe circumſtances, are not ſo prevalent at Paris, as they were ſome little time ago. Some people begin to leave off the uſe of ſwaddling cloaths; others accuſtom their children to go almoſt naked.

Among the variety of bad cuſtoms followed in bringing up children, there is none which appears more abſurd than that of obliging them to make uſe of the right hand only. No ſooner do the tender limbs of the infant begin to acquire a degree of ſolidity, than he is forced to feed himſelf with his right hand alone, which is ſaid to be a neceſſary qualification in a polite education. He ſoon gets the habit of uſing the right hand preferably to the left, and becomes imperceptibly aukward in all bodily exerciſes or motions he is obliged to perform on the left ſide. It is evident, from the trouble there is in bringing children to this, that it is by no means natural to them; and the aukwardneſs of left-handed people is at the ſame time a proof of the advantage of permitting children to uſe both hands indiſcriminately, and of the neceſſity of obliging them, as they grow up, to perform all the common exerciſes both with the right and left hand.

This method of educating, which I have taken notice of in Siberia, prevails all over Ruſſia, except among the great, where ſome changes have been introduced, as they began to be civilized. However preferable this method may be to that which is uſed among nations addicted to luxury and eaſe, it muſt yet be confeſſed, that an infinite number of children die, eſpecially among the common people, of whoſe families one third part is ſcarce ever preſerved; parents who have had ſixteen or eighteen children born, having often times no more than three or four alive: but there are various cauſes perpetually aſſiſting in

the depopulation of the ſeveral hamlets ſcattered abroad in theſe immenſe deſerts.

The ſmall-pox deſtroys almoſt one half of the children, and ſome times a greater proportion: the ſcurvy, and irregularities of the parents, bring on a variety of diſeaſes unknown to other children, which are the more hurtful, perhaps, in this country, as the only remedy they have, conſiſts in their ſtoves; which are very efficacious in diſorders proceeding from the nature of the climate, but in venereal complaints are only palliative *. Theſe diſorders are more dangerous here than in any other place, on account of their being uſually joined with the ſcurvy, and that the medicine proper for one of theſe diſeaſes always increaſes the other. Venereal diſorders are ſo general in Siberia, and in Northern Tartary, that there is reaſon to fear, leſt in proceſs of time they ſhould put an end to the human ſpecies in theſe parts. This may happen the ſooner from the manner in which theſe people live together in their cottages, and the exceſs of debauchery occaſioned by it. They are unacquainted with beds, and lie together promiſcuouſly upon benches, and on the ſtoves, ſo that the children are witneſſes even of the marriage rights; and the youth, being therefore ſooner informed than in other places, are more diſpoſed to give way to diſſoluteneſs.

Although I had at firſt reſolved to paſs the night in the hamlet of Melechina, yet the unbearable ſmell of the room I

* Some authors pretend however that the Ruſſians uſe the corroſive ſublimate in this diſorder, and particularly M. Macquer in his Chymical Dictionary (tom. ii. p. 65.) "Beſides," ſay this author, "it is well known that the corroſive ſublimate has been given internally with ſucceſs for a long time paſt among the Tartars and the Ruſſians, whoſe method of living incontinently with all ſorts of women, expoſes them continually to repeated attacks of venereal diſorders one upon another."

I have not been able to find, in all the courſe of my journey, from St. Peterſburg to Tobolſky, that the ſublimate was in uſe, and I have known ſome rich people affected with this diſeaſe go into Europe to be cured of it. Perhaps this medicine has been laid aſide, on account of the fatal conſequences which ſometimes attend the improper uſe of it.

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was in, made me leave the place a few hours after my coming there. Theſe inhabitants, ſhut up in their rooms the greateſt part of the year, have no communication with the external air, except by windows of a foot ſquare, always ſhut, and by a ſmall valve, which they open for ſome time in the morning, to let out the ſmoke; ſo that they live conſtantly in infected vapors, which have been collecting and fermenting together, near nine months in the year.

On coming from Melechina I quitted the mountains, and travelled in a very extenſive plain: the ſnow melted away ſo faſt and ſo ſuddenly, that in ſome places it ſcarce covered the ſurface of the ground. At Lialinſkoi, however, the thermometer remained ſtill at ſeven degrees below 0. On the 5th inſtant, I came to this hamlet, at five in the morning, and reached Verkaturia at one in the afternoon. This is a ſmall town in Siberia, not far from the river Tura: it is ſituated on rocks, and ſurrounded with ſome trifling fortifications, which have been built by the Ruſſians ſince they were in poſſeſſion of Siberia. The only way of paſſing from Ruſſia into Siberia was through this town, ever ſince Gagarin's time, who was governor of this province, and who, having laid a plan for making himſelf maſter of Siberia in the reign of Peter the Firſt, had ſhut up the road by Echaterinenburg, which was the moſt in uſe as being the ſhorteſt. From hence that road became neglected, and was not opened again till the year 1761, by expreſs orders from the Empreſs Elizabeth. The cuſtom-houſe is very ſtrict at Verkaturia: but as I was apprized of this at St. Peterſburg, I had applied for an order from the chancellor, to prevent the caſes containing my inſtruments from being opened. They had hitherto remained juſt as they were packed up at Paris. I obtained this permiſſion, notwithſtanding the ſtrictneſs of the regulations. Peter the Firſt had given a general order, that all inſtruments relating to arts and ſciences ſhould be ſuffered to

paſs unnoticed: this indulgence I could not avoid taking notice of here, as it does ſo much honor to that monarch; but his ſucceſſors found themſelves obliged to repeal the order, on account of the abuſes that were ſoon made of it. The maſter of the cuſtom-houſe, whoſe name was Michitas Ivan Soubatof, only aſked a few general queſtions about my baggage, and treated me with the greateſt politeneſs. He made me a preſent of two ſable ſkins, a few pounds of tea, and different ſorts of proviſions. As I was going away, he did me the honor of a viſit, with ſome of the principal people of the town. I had ſtill ſome Luneville *liqueurs*, and ſome bottles of Burgundy remaining, from what the Baron de Breteuil had given me at ſetting out from St. Peterſburg. I perſuaded them to drink ſome with me: they were very much pleaſed with our Burgundy; for there is no wine in Siberia but what is brought by travellers; but our *liqueurs* were inſipid to them, and too weak. As they are uſed to the ſtrongeſt ſpirits, the French *liqueurs* ſcarce made any impreſſion on their palates. They preſſed me ſo much to ſtay at Verkaturia, that I put off going from thence till night. Mr. Soubatof perſuaded me to take ſome refreſhment at his houſe, where I found all his family. I could not ſee his wife otherwiſe than by her chamber door being half open: ſhe was extremely pretty and very well dreſſed, but it was impoſſible to prevail upon her to appear any farther. I went away at eight in the evening; it was very dark, and the road exceedingly bad; ſo that I had all the flambeaus lighted. I travelled all night without any accident, although I had been told before I came away from Verkaturia, that I ſhould meet with many. The weather, which was very mild when I left this town, became, to my great ſatisfaction, ſuddenly colder, at three o'clock in the morning. The thermometer fell to nine degrees below the freezing point; but as ſoon as the ſun appeared on the horizon, it roſe again with the utmoſt

utmoſt velocity. My courſe was now to the ſouth, and the ſnow diſappearing continually, I was determined not to loſe a moment, leſt I ſhould be overtaken by a thaw. The ſame day, the watchmaker's ſledge broke in the middle of the road. As we had no aſſiſtance at hand, it was faſtened up with cords, and with much difficulty brought on to Makhneva, where I intended to get it mended; but finding no body who would undertake to do it, I immediately bought another. While they they were getting this new ſledge ready, I dined at a houſe in the hamlet, and ſaw the Poſtilions dine: they had clubbed with ſome other Ruſſians, who were carrying proviſions to Verkaturia; they all placed themſelves round a ſmall table, the only one in the houſe, ſome on benches, others ſtanding up. A ſoup made of ſour *krout* and oatmeal, without bread, was firſt ſerved up in a ſmall wooden bowl; this they eat with wooden ſpoons: I had a fancy to taſte ſome of their bread, although it was as black as ink, but could not poſſibly eat it. This firſt bowl was taken away, and another brought up, full of ſour *krout*, dreſt with oil of fiſh. Sometimes the ſour *krout* is dreſſed with oil of hemp-ſeed, or bear's greaſe. Their drink was the *quouas* or kwas, the ſame as is uſed by the other Ruſſians, and which I have already ſpoken of. Each man paid one *ſol*, or one halfpenny Engliſh, for his dinner, which ſometimes conſiſts of peas, turnips, and radiſhes, boiled in water, with a little ſalt. It was then Lent, during which ſeaſon they neither eat meat, milk, butter, or fiſh: they take great care not to leave the leaſt remains of their victuals on the table; but gather them up very ſcrupulouſly and eat them. The table, after dinner, is the only clean piece of furniture in the houſe. Having been almoſt ſtifled with the heat, I put my thermometer upon the loft, where the people ſleep all night and part of the day. It immediately roſe to forty degrees, or near ten degrees higher than it is in the greateſt ſummer-heats at Paris. There were four

or five women in this houſe, who hid themſelves behind a kind of curtain when we came in; they ſoon grew more familiar, and were much ſurprized at ſeeing us eat meat, and all our other proviſions, from which they are debarred during this Lent ſeaſon. They are ſo extremely ſtrict in this particular, that when I gave a piece of cake to one of their children, about three years old, the mother took it away immediately; and the youngeſt child, of ſeven or eight months, was the only one allowed to eat it. The exceſſive heat obliged me to throw off my fur, and I put on a French great coat. The women admired it very much, and ſurveyed, with the greateſt curioſity, every part of my dreſs, which appeared quite new to them, although this was the only road in uſe. Theſe women ſeemed more lively than any I had ſeen ſince I came from Moſco, eſpecially ſince I had travelled on that ſide of the Volga. They were alſo better made, taller, and had better complexions than I had met with in this latter part of my journey. Two girls of the houſe particularly were very pretty: they had ſomething like ruffles to their ſhifts, which I had not obſerved in any other part of Ruſſia among this claſs of people.

My route from the river Volga lay always through the ſame foreſt, where I commonly met with nothing but hamlets, in which the moſt extreme wretchedneſs prevailed. The country became more open as I got away from the mountains, and the villages more populous. The Siberian women are dreſſed generally in the ſame manner as the Ruſſians; the girls wearing their hair in treſſes, and never putting on a cap till they are married. Married women never go without caps. I left this place as ſoon as the ſledges were ready, and came to the hamlet called Babikhina, on the 7th inſtant at noon. The thaw was ſo complete, that the ſnow was melted every where except on the beaten track. A little water lying upon the rivers, yet frozen, made me ſenſible of the danger of croſſing them. Every body

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was ſpurred on by this fear, and the deſire of coming ſoon to Tobolſky, from whence I was now only ſeventy leagues diſtant; and all endeavoured to vie with each other in getting things ready at every poſt. I came to Tumen at midnight, and was intending to ſet out from thence immediately; but could find nobody who would run the riſk of croſſing the river, as the people at the poſt-houſe expected every moment that the ice would break up. I tried every poſſible expedient to perſuade them to go on, but they wanted to wait till day-light before they took their reſolution. I was ſtill at the diſtance of ſixty leagues from Tobolſky, and if I loſt this night, it might prevent me from reaching the city before the breaking up of the ice; in which caſe I muſt have remained where I was, as it would then have been impoſſible to travel even in a boat, becauſe the whole country is overwhelmed with torrents pouring down from all ſides. I ſpoke to the old poſtilions, and repreſented to them, that as they had croſſed different rivers with me in the courſe of the day without any apparent danger, theſe ſort of paſſages could not poſſibly have become more hazardous in a few hours time. I promiſed to pay them double poſtage, and gave them ſo much brandy to drink, that they at laſt reſolved to go with me. I then perſuaded the people of the poſt-houſe to ſupply me with horſes, and we croſſed the river without accident.

On the 9th inſtant, about five in the morning, I arrived at Sozonowa, and was detained a long while at this hamlet for want of horſes. I was deſirous of making up the loſt time, by giving brandy on the road to the poſtilions, in hopes of prevailing upon them to get on with the utmoſt expedition; but the ſnow being entirely melted in moſt places on the road, I could not, notwithſtanding this precaution, reach Berozovia before four in the afternoon, and did not come to the poſt of Vakſarina, where I was to croſs the river Tobol, till nine in the

evening. I immediately aſked for horſes, which were refuſed, and which I was not likely to obtain, after diſputing for an hour. I could not but be perſuaded of the danger there was in croſſing this river; and at the perſuaſion of the inhabitants, I had at firſt determined to make my obſervations on this ſpot; but beſides the inconvenience of the ſituation, I ſtill wanted the authority of the ſovereign to enable me to build an obſervatory, and to prevent me from being interrupted in my operations, ſo that I found this impracticable. I began to be ſufficiently acquainted with the people, to know that the civilities I had experienced on the road, were owing to my meeting with a few good people, and chiefly to the letters of recommendation I had from M. de Woronzof. On all occaſions, where the inhabitants had been left to themſelves, I had met with the greateſt difficulties, and in this inſtance I had alſo much to fear from the ſuperſtition of ignorant people.

Beſides, I was not more than twenty-five leagues diſtant from Tobolſky, ſo that I could have got there in twelve hours, and juſt as I thought all my fatigues at an end, I began to be afraid of miſſing my obſervation. I could not bear up againſt this idea; a cold ſweat came all over me, attended with an univerſal dejection. I was preſently rouzed from this ſituation by the agitation of my mind, and propoſed that a kind of way ſhould be made over the ice with boards or branches of trees; but the people were ſo obſtinate, that they found all my propoſals impracticable, and peremptorily refuſed undertaking them. This made ſuch an impreſſion on me, that I was inclined to force them to go along with me; but the project which then came into my head, of buying up the horſes and conducting ourſelves, made me a little more calm. I went out for a moment to conſider what I ſhould do, and imagined this laſt ſcheme was the moſt eligible; as my attendants ſeemed reſolved never to leave me. I came into the houſe again pretty

calm,

calm, called for ſomething for ſupper, and gave brandy to every body; as the firſt thing neceſſary, after what had paſſed, was to bring people into good humour again.

In the mean time my thermometer was brought me, and I fixed it againſt the wall, to determine the heat of this place, which was ſuffocating. The people were as much ſurprized at this inſtrument, as the inhabitants of Kuzmodemianſk had been at the barometer, which they took for a clock. The thermometer had the greater effect on the people of Vakſarina, as it roſe with great velocity when brought out of the cold air into a very hot ſtove. Obſerving they were very attentive to this phenomenon, I told them, without any particular intention, that the thermometer pointed out heat and cold; that the mercury roſe in the firſt, and fell in the laſt inſtance. This ſimple explanation was not underſtood; they thought there was ſomething wonderful in the inſtrument, which I ſoon perceived, and determined to take my advantage of it. The thermometer preſently roſe to twenty-five degrees, I then took hold of it, and very confidently told them, that by carrying it out of doors it would ſhew us whether there was any danger in croſſing the river; and that if there was not, it would fall down to a certain point which I ſhewed them. This point was one degree below o: the thermometer, at this time, was generally two or three degrees below that point in the open air; and the place I marked was more than four inches below the twenty-five degrees. They directly fixed the thermometer out of doors: I came in immediately, and ſpoke no more about going away. I ſoon perceived that ignorance and ſuperſtition were at work in their minds, already agitated by ſome expreſſions I had dropped about the deſign of my journey, and which they underſtood no more than the uſe of ſome of my inſtruments they had ſeen.

I was employed in making them drink, when the moſt ſtubborn fellow among them, who had ſlipped out without my ſeeing him, came in again, and told me with enthuſiaſm, that the animal had got down below the mark. They all ran immediately to be convinced of this fact, and I had now no difficulty to ſtruggle with, except that of hindering my interpreter from explaining that the mercury was not an animal. I preſently got a ſufficient number of horſes, and the poſtilions went away immediately: the one who had been moſt ſullen all the day, was now the warmeſt in the cauſe. I gave him the care of the ſledge where my inſtruments were; he went foremoſt, and the others followed. As ſoon as we got out of the hamlet we diſcovered the river, and this was the only object we could diſcern, in the midſt of the darkneſs which covered this hemiſphere: the faint glimmering of the ſtars, reflected in the water, which flowed on the uneven ſurface of the ice *, made us ſee the river at a diſtance, by the different ſhades of their dim light, and made an appearance of waves gently agitated. We ſoon came to the borders of the river, where all was profoundly ſilent. The firſt poſtilion was preparing to croſs it, and ſtopped ſhort. I ſtood upright on my ſledge; and called out to him *ſloupai* (go on); puſhing, at the ſame time, my own poſtilion ſo violently, that he went on immediately. The firſt poſtilion, not willing to be overtaken, gets on at a ſtill greater rate; the others follow, and we were on the other ſide of the river in an inſtant.

I did not however enjoy the happineſs of this moment as I ſhould have done. I had but juſt croſſed the river when I was ſeized with an univerſal tremor, accompanied with convulſive ſtarts: my ſtrength, which ſeemed to have increaſed the nearer

* Theſe inequalities being occaſioned by part of the ice which was already melted, do not contradict my former obſervation, aſſerting that the ſurface of the frozen rivers was perfectly ſmooth.

I came

I came to this inſtant, now forſook me all at once; ſo that I drank ſome *liqueur* I ſtill had in the ſledge. I ſoon found myſelf relieved, and fell aſleep, in which ſituation I ſtill remained when we ſtopped at the poſt of Cheſtakova. I left this place immediately, and in a few hours came to Dektereva, where I was to change horſes for the laſt time. As the river Irtiſz was ſtill between me and the city of Tobolſky, I expected to meet with freſh difficulties from the people of this hamlet; but was glad to find myſelf deceived. The inhabitants ſtill continued to croſs the river at Tobolſky on the ice, becauſe this paſſage being more frequented, the ſnow was ſo much beaten by the feet of men and beaſts, that it was become united to, and conſolidated with the ice, ſo as to make it thicker.

At length I arrived at Tobolſky on the 10th of April, ſix days before the ice broke up, after having travelled on a ſledge from St. Peterſburg, about eight hundred leagues, or three hundred thouſand and eighteen werſts, in a month, although I had been delayed by ſeveral accidents, and by the difficulty of getting horſes.

Immediately on my arrival, I went to ſee M. de Soimanof, governor of the city. He ſent for his daughters; the eldeſt was a widow, who came up to ſalute me, and took my hand to kiſs it. As I was unacquainted with the Ruſſian cuſtoms, it put me at firſt a little out of countenance, but I ſoon recovered myſelf. As the two other ladies, the youngeſt of whom was nineteen or twenty, were coming forwards with the ſame intention, I went towards them, and after having ſaluted them in their manner, I kiſſed their hands, and immediately withdrew mine. According to the true *etiquette*, I ought indeed to have kiſſed their hands, while they were doing me the ſame honor, but I ſhould have ſtaid in my place till they came up to ſalute me.

The

The governor received me with great politeneſs: he convinced me of the eſteem he had for the ſciences, which he cultivates and is fond of. He ordered me a guard, conſiſting of a ſerjeant and three grenadiers; and at the ſame time ſupplied me with every thing I wanted.

I directly ſet about building my obſervatory, and preparing every thing which belonged to it, but could not get it finiſhed before the 11th of May. I immediately fixed my inſtruments, and on the 18th inſtant, although the weather was cloudy, I yet found an opportunity of obſerving ſeveral phaſes of a lunar eclipſe. I had prepared on the 3d of June, to obſerve an eclipſe of the ſun, inviſible in France. This obſervation was of the more conſequence, as it enabled me to determine the preciſe longitude of Tobolſky, which I could not expect to find from obſerving the eclipſes of Jupiter's Satellites, becauſe this hemiſphere, in the ſummer time, is almoſt conſtantly lighted by the ſun; and beſides, this eclipſe being viſible alſo at Sweden, Denmark, and at St. Peterſburg, I was ſure of meeting with obſervations to anſwer mine. The ſky was cloudy at the immerſion of the eclipſe, and although it was in June, a great quantity of ſnow fell; but I obſerved the emerſion with great accuracy. The longitude of Tobolſky, reſulting from this obſervation, being compared to that of Stockholm, communicated to me by M. Deliſle, turns out to be four hours, twenty-three minutes, thirty-four ſeconds, with reſpect to the meridian of Paris.

The inhabitants of the town, not much uſed to ſee ſtrangers, had been ſurprized at my arrival: they had ſeen my obſervatory conſtrued immediately, and as its form was very different from their buildings, they thought there was ſomething myſterious in it. They were much aſtoniſhed at its being placed on a mountain, from whence I was able to take in the whole horizon; beſides, that it was about three quarters of a mile diſtant

from the town. At firſt, they knew not what to think; but when they ſaw a quadrant, clocks, a parallactic machine, and a teleſcope nineteen feet long, inſtruments they had never ſeen before, they concluded that I was a magician. I was buſied all day in obſerving the ſun, in order to regulate my clocks, and to try my teleſcopes. At night I viewed the moon and ſtars; and made uſe particularly of a ſmall lamp, fixed to my quadrant, that I might diſcern the threads of the micrometer; ſometimes I did not return to the city till morning, exceedingly fatigued, and the little care I took of my dreſs, confirmed the people in the opinion they had entertained of me.

The governor, and a few more, were the only perſons who knew that I had undertaken this journey to obſerve the Tranſit of Venus over the Sun; all the reſt of the inhabitants were miſled by their ſuperſtition. The leaſt ignorant among them reported a number of abſurdities about this obſervation, and others expected at that inſtant the end of the world. They looked upon me as having occaſioned the overflowing of the river Irtiſz, which was ſo conſiderable this year, that part of the lower town was laid under water, as high as the roofs of the houſes, and ſeveral perſons loſt their lives, in carrying their goods through the torrents of water, which overthrew and ſwept away the dwelling-places. Several pieces of the mountain were ſeparated in different places, and fell into the river with a dreadful noiſe. Some of the inhabitants, whoſe houſes were on the ſides of this mountain, were obliged to quit them, leſt they ſhould be carried away into the river. The ſaltern was entirely overwhelmed, and although they were as quick as poſſible in endeavouring to ſave the ſalt, yet the greater part of it was loſt. The plain at the foot of the mountain of Tobolſky, exhibited an appearance, to thoſe who were on the top of the mountain, of a number of iſlands ſcattered on this watery ſurface, and extending as far as the ſight.

This

This river overflows every year, when the ſnows are melted; but it had never been known to do ſo much damage; ſo that this circumſtance encouraged the people in their extravagant opinions, who imagined they ſhould ſee no end to their misfortunes till I was gone from Tobolſky. As my thoughts were quite taken up about the obſervation, I was unacquainted with all that paſſed on this occaſion; and was ſo far from ſuſpecting, that I generally left the guard at home, and went to the obſervatory, attended only by my interpreter, and ſometimes by the watch-maker; but the guard was then ordered always to follow me. Some of the Ruſſians adviſed me not to go alone to my obſervatory, and to take ſome precautions againſt the fury of the mob, which might lead them to any lengths. The advice was too prudent not to be followed, and from that time I determined to paſs moſt nights in the obſervatory, leſt they ſhould attempt to pull it down. On the 4th inſtant, the wind was ſo high and ſo continual, that I was in the greateſt danger of having it blown down, and was not freed from my apprehenſions till the next day at noon, when the wind abated.

The event which occaſioned my journey was now at hand, and the next day, being the ſixth of June, was to ſatisfy all my inquiſitiveneſs. M. de Soimanof, Count Pouſkin, and the archbiſhop of Tobolſky, who all deſerve more than I can ſay of them, having expreſſed a great deſire of ſeeing this phenomenon, I had a tent pitched, in which I put a teleſcope for them and their families, that I might not be diſturbed in my obſervation.

On the 5th, I was employed all day in arranging my inſtruments, and reſolved to paſs the night in my obſervatory. Every circumſtance ſeemed to anſwer my wiſhes, and to flatter me that my obſervation would be ſucceſsful. The ſky was clear, the ſun ſunk below the horizon, free from all vapors; the mild glimmering of the twilight, and the perfect ſtillneſs of the

the univerſe, completed my ſatisfaction, and added to the ſerenity of my mind. I made every body go to ſupper, but my contemplative ſituation prevented me from partaking of any food. This pleaſure however did not laſt long, for as I went out about ten o'clock, to enjoy it in ſilence, I was diſtreſſed at the ſight of ſome fogs, which partly deprived the ſtars of their light. I caſt my eye all over the horizon, and was much diſpirited on ſeeing already a number of clouds forming on all ſides, which became thicker every inſtant; the darkneſs of the night ſtill increaſed, the bright ſky diſappeared; and the whole hemiſphere was ſoon overſpread with one ſingle black cloud, which damped all my expectations, and threw me into a ſtate of deſpondency.

The obſervation of this Tranſit, gave the world an opportunity, for the firſt time, of determining preciſely the parallax of the ſun. This phenomenon, expected for more than a century paſt, had fixed the attention of aſtronomers, who were all deſirous of ſharing the honor of it. The famous Halley, who foretold it, was the firſt who manifeſted its importance, and even on his death-bed lamented the impoſſibility of his being witneſs of it. The whole learned world had taken all poſſible meaſures to aſſiſt the obſervation. Sovereign princes, although engaged in an expenſive war, had neglected nothing that could inſure the ſucceſs of this important matter, which might enhance the glory of their annals, and at the ſame time be productive of the moſt ſubſtantial advantages to their ſubjects, and to mankind in general.

The idea of returning to France, after a fruitleſs voyage; of having expoſed myſelf in vain to a variety of dangers, and to fatigues, under which I was ſupported only by the earneſtneſs and expectation of ſucceſs, which I was now deprived of by a cloud, at a time when I had the greateſt reaſon to be aſſured of it, threw me into ſuch a ſituation as can only be felt.

I had not the trifling ſatisfaction of ſeeing any perſon who might ſhare my anxiety. All my attendants had taken notice of it, but had gone into the obſervatory, where I found them faſt aſleep. I rouſed them all, they then left me alone, and I found myſelf relieved by their abſence.

In theſe dreadful agitations I paſſed the whole night; I went out and came in again every inſtant, and could not continue a moment in the ſame poſition.

Such trials muſt have been experienced, to be ſenſible of the exceeding pleaſure I felt, when my hopes were revived by the riſing of the ſun. The clouds however were ſtill ſo thick, that this region was yet involved in darkneſs, notwithſtanding the light of the ſun; which was only diſtinguiſhed by a reddiſh caſt on the clouds: but an eaſterly wind drove this gloomy veil towards the weſt; and ſoon expoſed part of the ſky at the horizon. This appearance increaſed by imperceptible degrees; the clouds began to exhibit a whitiſh colour, which grew brighter every inſtant; a pleaſing ſatisfaction diffuſed itſelf through all my frame, and inſpired me with a new kind of life. The clouds ſtill continued to be diſperſed, the face of nature became pleaſant, every thing, in ſhort, ſeemed to rejoice at the return of a fine day; and as my hopes became more ſanguine, the joy of my mind was ſtill more complete.

The governor, M. Pouſkin, and their families, then came up, and ſhared my happineſs. They were ſoon followed by the archbiſhop and ſome of the *archimandrites*. I had ſtrengthened my guard, apprehending that I ſhould be interrupted by a number of curious people, but this precaution proved unneceſſary, as all the inhabitants had ſhut themſelves up in the churches, or in their houſes. Although the ſun was not yet viſible, it was evident however that he would ſoon make his appearance. I prepared for the obſervation, and the company went into the tent I had pitched for them. My watch-maker's

buſineſs was to write, and keep his eye on the clock, while my interpreter was employed in counting the time; the calmneſs and ſerenity of the air had made me reſolve to bring my inſtruments out of the obſervatory, that I might move them more readily. I ſoon perceived one of the borders of the ſun, at the time that Venus was to enter upon his diſk; but on the oppoſite border, which was ſtill concealed by the clouds. I ſtood fixed with my eye to the teleſcope, wandering over the immenſe ſpace between us and the ſun a thouſand times in a minute. I was troubled by the continuance of the cloud, which at length however diſappeared, and perceiving that the planet was already immerſed, I prepared to obſerve the moſt material appearance, the total entry. Altho' the ſky was perfectly ſerene, yet my apprehenſions were not yet at an end. The moment of the obſervation was now at hand; I was ſeized with an univerſal ſhivering, and was obliged to collect all my thoughts, in order not to miſs it. At length I obſerved this phaſis, and felt an inward perſuaſion of the accuracy of my proceſs. Pleaſures of the like nature may ſometimes be experienced; but at this inſtant, I truly enjoyed that of my obſervation, and was delighted with the hopes of its being ſtill uſeful to poſterity, when I had quitted this life.

The ſky remaining clear the whole day, I went on eaſily with my other obſervations, which I diſpatched a few days after, by an expreſs, which the governor ſent to the Ruſſian court: I ſent one copy to the academy at St. Peterſburg, and another to that at Paris. I ſtayed, however, at Tobolſky till the 28th of Auguſt, to make ſome farther aſtronomical obſervations. During this time I was employed in acquiring ſome knowledge of the country of Siberia; and have joined my inquiries on this ſubject, with thoſe I made in going to Tobolſky, and with other particulars, occaſionally diſcovered in the courſe of my journey returning to St. Peterſburg.

RETURN
FROM
TOBOLSKY
TO
St. PETERSBURG, 28th Auguſt, 1761.

THE inſtructions I had received at Paris, permitted me to ſtay but a ſhort time at Tobolſky, after my obſervation of the Tranſit of Venus. When I began to think of leaving this place at the end of Auguſt, I was ſeized with an almoſt continual vomiting of blood, attended with ſuch a loſs of ſtrength, that I could ſcarce ſupport myſelf, and was unable to reach my obſervatory without aſſiſtance. My indiſpoſition hurried me ſtill quicker from a country where a hot bath was the only remedy for every diſorder, and I was the more unwilling to ſubmit to this, as I had already been nearly ſuffocated in one of them at Solikamſky. I had a very compleat medicine cheſt with me, and a circumſtantial account of the virtues of every thing it contained; but having had the misfortune to poiſon a Ruſſian, in attempting to cure him of ſome ſlight complaint, I had determined to lay aſide the practice of phyſic: it happened very fortunately, that the doſe was not ſtrong enough to deſtroy the patient.

My departure, however, was ſtill attended with many difficulties: my ſervant, who ſuffered for his gallantry at Tobolſky, was ſo very ill, that he could be of no uſe to me; beſides, both

both he and the watch-maker were ſeized with a dread of being aſſaſſinated on our way by robbers, who were then ſaid to commit murders every day on the road to Echaterinenburg.

I had determined to take this new route, as it would give me an opportunity of examining the mines of Echaterinenburg, and the different people inhabiting the ſouthern borders of Siberia. Theſe objects appeared of ſo intereſting a nature, that I could by no means think of altering my plan.

The governor, with great politeneſs, offered me a guard of four ſoldiers to attend me to St. Peterſburg. I refuſed it at firſt, thinking that the difficulties of my journey would increaſe in proportion to the number of my followers; but all my attendants were ſo diſpirited, that I reſolved to accept of M. de Soimanof's offer. The guard conſiſted of a ſerjeant and three grenadiers well armed. I provided ammunition and arms for all my fellow travellers; beſides which, a blunderbuſs was given me. I had a large carriage made for my inſtruments, the reſt of my baggage, my proviſions, and utenſils. I had alſo two carriages commonly called *dormeuſes:* the ſoldiers were diſtributed on the different carriages; and one of them was on mine with the blunderbuſs. This diſpoſition, and the military appearance it had, quieted every body. I ſet out on the 28th of Auguſt, to the great ſatisfaction of the people of Tobolſky, who imagined that the Irtiſz would not return into its channel, till I was gone. I could not take my leave of the archbiſhop, and of M. de Soimanof and Pouſkin, without being extremely affected.

Although the month of Auguſt was almoſt at an end, the harveſt appeared ſtill diſtant; the hot days were over, the inſects, ſo troubleſome in this part of the world, were gone; and the ſeaſon in every reſpect ſeemed fit for travelling. My indiſpoſition left me in a few days; but yet I did not find my journey ſo agreeable as I thought it would have proved: the

continual

continual rains, ſubſequent to the melting of the ſnows, hindered me greatly in croſſing that extent of land between Tobolſky and the mountains. The ſoil being marſhy for the ſpace of near one hundred leagues, the roads were ſo bad, that I was obliged to ſend a ſoldier forwards, to fill up ſome places with faſcines which would otherwiſe have been unpaſſable. I ſoon found it inconvenient to travel through theſe roads in the ſummer, eſpecially with large carriages. Thoſe which the natives uſe, are very ſmall and light; they call them *Kuibics*. My large carriage, laden with baggage and proviſions, was ſo heavy, that it ſank readily into the mire, from whence it could not be withdrawn without difficulty, even with the aſſiſtance of twelve horſes.

From the 28th to the 30th of Auguſt, I croſſed part of the plain between Tobolſky and the mountains (called Poyas Zemnoi). We met with ſuch quantities of ducks, that without going out of my way, I could ſhoot enough for myſelf and all my company; which was a great help to us, becauſe I had little elſe but ſalt meat along with me. It is cuſtomary in theſe journeys, to lay in a ſtock of chickens, geeſe and tame ducks, which are ſhut up in coops. The archbiſhop, M. de Soimanof, and M. de Pouſkin, had furniſhed me with a quantity of theſe, which I placed on the carriages, but being out of patience with the trouble they gave, I had ſome of them killed a few hours after ſetting out, and ſet the reſt at liberty.

Notwithſtanding the badneſs of the roads, I travelled agreeably enough for the few firſt days; the weather was fine, and I met with villages where I was able to take my meals; I ſometimes halted on the banks of rivers; and the greateſt inconvenience I felt, was from not having any bread but that of the country, which I never could reliſh.

On the 31ſt inſtant, I came to Tumen, a ſmall town, part of which ſtands on a mountain bordering the river ſouthward.

Its

Its ſituation is as pleaſant as that of Tobolſky, but it has few inhabitants. I received great civilities from M. Ivan Afananſcoiſk, the Waywode; he made me a preſent of ſome tea and ſugar; ſeveral others of the inhabitants were kind enough to come and ſee me, and brought me alſo ſome preſents; but they frightened my little caravan, by telling us that four ruffians had been taken up the night before, at the diſtance of three leagues from this town; they aſſured us likewiſe, that they went in gangs along this road; that they not only attacked and pillaged travellers, but even ſmall villages: moſt of theſe robbers had deſerted from the recruits, or had eſcaped from the mines of Echaterinenburg. This account made me more cautious; I inſpected all the arms, and laid in a freſh ſtock of brandy, to keep up the courage of my company; ſometimes diſtributing it myſelf to the poſtilions, and the reſt of my attendants. I had perfectly recovered my health, and every thing was done with ſo much alacrity and mirth, that my people ſeemed to have got rid of their fears. I had eight men along with me well armed, and the blunderbuſs charged with caſe-ſhot, was placed on the fore-part of my carriage; ſo that as I feared nothing but a ſurprize, I diſtributed to each carriage ſome flambeaux made for me at Tobolſky, and had them lighted at night.

On the 1ſt of September, at three in the morning, I came to the borders of the river Piſzma, oppoſite to the hamlet Kila. This river is forty toiſes wide; I was going to croſs it, over a float of timber fixed to the banks at each end, and ſerving for a bridge; in which manner moſt of the bridges in Siberia are conſtructed. But this bridge was ſo bad, that as ſoon as the fore-horſes of the large carriage had ſet their feet upon it, they fell in breaſt high; ſeveral half rotten cords then giving way, I inſtantly ordered the traces to be cut, and immediately perceived, that the current was carrying away the decayed bridge

bridge with the horſes upon it, which were got out with much difficulty. One of the ſoldiers ſwam acroſs the river, and went to the hamlet Kila, on the oppoſite ſhore, for aſſiſtance. This hamlet conſiſting of five or ſix houſes, had been attacked on the 29th of Auguſt, by the gang of the robbers before-mentioned; three of the country people loſt their lives on this occaſion, but they drove off the ruffians, after having killed two of them. The ſoldier could not bring away more than two of the country-men; we immediately went all to work, and about ſeven in the morning got the carriages over, taking care not to have more than one at a time on the bridge.

At eleven at night, I came to Kuiarowſkaia. My carriages were ſo much injured, that I ſtopped here to get them repaired, but could find nobody who was able to mend them; ſo that I was obliged to ſend a ſoldier to the neighbouring village for a cartwright; for not one of the peaſants could be prevailed upon to go; ſuch terror had the robbers ſpread round about. Report and fear had greatly increaſed their numbers and rendered them formidable. I employed the reſt of the night in getting the carriages repaired, and ſet out at ſix in the morning.

As I came nearer to the chain of mountains, the ſoil was more cultivated, and there were ſcarce any marſhes to be ſeen at Wolkava. The earth was black, as it was all the way from Tobolſky; but here it was firmer. The land round about this hamlet ſeemed to promiſe a plentiful harveſt of corn, barley, and oats; but the people were apprehenſive, that the cold would prevent them from ripening. I was then in fifty-ſix degrees fifty minutes latitude, and about one hundred and twenty-five leagues diſtant from Tobolſky. All this plain appeared to be but one univerſal marſh, which made excellent ground for paſture; it was ſcarce cultivated in any part, except in the neighbourhood of Pokrowſkaïa and Tumen, where

I ſaw

I ſaw ſome very fine corn, ſome oats, and a ſmall quantity of barley. The graſs grows very thick in this immenſe plain. I found only ſome few ſmall foreſts, ſcattered in the middle of the marſhes; and theſe were chiefly of light woods, ſuch as birch, poplar, *&c.* I ſeldom met with fir-trees before I came to Wolkava, where I was obliged to ſtop for the repairing of my carriages. The night was ſo fine that I halted in the middle of a graſs plat; but it was very cold, notwithſtanding a large fire was kindled; for a hoar-froſt covered the ground on the third of September. I ſet out at eleven in the morning; and in the neighbourhood of Koſulina met with ſome ſtones for the firſt time, ſince I quitted Tobolſky; from which it was evident, that the mountains were near; and indeed I entered upon them almoſt as ſoon as I got clear of the hamlet. Here the road was dreadful, and became ſo dangerous in the night, that notwithſtanding the light of the flambeaux, we were obliged to croſs moſt of theſe mountains on foot. At length I reached Echaterinenburg, on the 4th of September, at one in the morning. My people were ſo much fatigued, that they choſe to paſs the reſt of the night in the carriages, without unloading either of them. As to myſelf, I had my matraſs laid on the ground in the ſmall room where I was. At the ſame time I was told, that was the lodging appointed for me by the commandant of the town, and I muſt not expect any other; yet it was ſo ſmall, that I could not poſſibly live in it. I ſent a ſoldier forwards to the commandant, with the orders of the Empreſs, and to acquaint him of the intention I had of ſtaying a few days in this town. The orders expreſſed that I ſhould be furniſhed with all the helps and accommodations I could poſſibly deſire; and indeed they had been hitherto punctually executed. I roſe early in the morning, to learn ſomething about the cuſtoms of the place, before I made any viſit. I ſent a ſoldier to the commandant,

to inquire what time of the day I might pay my reſpects to him: he ſent me word, that he ſhould not be at home. This anſwer, which I little expected, diſconcerted me exceedingly. I had letters to the principal inhabitants of the town, whom I could not go to with propriety, before I had ſeen the commandant, and I could not well wait till he was in a better humour. I therefore determined to call at his houſe, that I might not be in any particular neglectful of what I thought my duty, and then went about the town to pay my viſits, fully reſolved to quit the place immediately, if the inhabitants had been all as ſtrange as the commandant; but, on the contrary, they received me with all poſſible kindneſs and civility. I went home again very well ſatisfied. It was then two o'clock in the afternoon; I had taken no food, any more than the perſons who attended me, ſince eleven o'clock in the morning of the preceding day, and had no more than two roaſted ducks left for eight people. I was preparing to ſend out for proviſions, when I received ſome from all the perſons I had viſited, and in an inſtant my little room, of ten feet ſquare, was filled with two ſheep continually bleating, with geeſe, ducks and fowls. Theſe animals made ſo much noiſe, that I was obliged to go out into the ſtreet, to learn the names of the perſons I was indebted to for this kindneſs.

One of the ſoldiers immediately ſeized a ſheep, and carried it to a good old woman in the neighbourhood; and in little better than an hour's time, he was killed, roaſted, and almoſt eaten up.

I went in the afternoon, to return thanks to the perſons who had been ſo obliging to me; and the freſh civilities I received from them, removed all the prejudices I had entertained on my firſt arrival againſt the inhabitants of the town. M. Artibacher, firſt counſellor of the chancery, and his lady, were exceedingly polite to me. I found him a chearful, intelligent,

and moſt agreeable man, although confined to his bed by an indiſpoſition. His lady, about fifty years of age, ſtill retained the marks of former beauty. Her countenance and behaviour were tokens of her good qualities, and of the reſpect paid to her by the whole town. She was fond of foreigners, and ſought every opportunity of doing them ſervice. She told me by my interpreter, in preſence of her huſband and all the company, that ſhe would be my mother, and direct my houſe-keeping for me, while I ſtaid at Echaterinenburg. I felt the kindneſs of this offer ſo ſenſibly, that I was unable to anſwer a word; but ſhe was pleaſed to conſider my ſilence as the ſincereſt mark of my gratitude. Her huſband, who ſpoke French a little, ſoon rouzed my attention, by aſking me divers queſtions relative to the intent of my journey. His lady having underſtood part of our converſation, which turned upon the mountains obſervable in the moon, on Jupiter, *&c.* deſired her huſband to aſk me, if I could not ſhew them to her through my teleſcopes. It is hardly neceſſary to ſay, that my anſwer was ſuch as to ſatisfy her. I took my leave almoſt immediately after, quite full of the project I at that inſtant conceived.

My lodging was ſo ſmall, and in ſo much confuſion, that I could not poſſibly receive any perſon in it; I therefore endeavoured to get another. The baron de Strogonof had given me a letter to his people, ordering them to aſſiſt me in every thing I wanted. After much inquiry, I learned that one of his people was in the town: and ſent to deſire he would call upon me. He came, and found that the letter was not from his own maſter, but from a relation of the ſame name: he offered me, however, his ſervices, aſſuring me, that if he could be happy enough to be of any uſe to me, he knew he ſhould oblige his maſter. I ought not certainly to omit mentioning, to the credit of the family of the Strogonofs, that wherever I

have paſſed through any of their eſtates, I have been very civilly treated by their ſtewards. This illuſtrious family ſeems to entertain an hereditary regard for foreigners. M. Strahlemberg, and all who have travelled after him in this country, have alſo experienced the ſtrongeſt marks of favour from them *.

I begged the favour of M. de Strogonof's ſteward to get me a more convenient and larger apartment: he procured me one the very next day, and I did not find out, till after I was gone, that he had given me up his own. I ſettled myſelf in it the ſame day, and prepared a ſmall obſervatory there, intending to make ſome aſtronomical obſervations on this town, in order to determine its poſition.

The inhabitants of the town did me the honor to come to ſee me next day in a body, and to offer me a guard. I thanked them much for this freſh mark of their kindneſs, but begged earneſtly of them not to ſend it, as the one I had was ſufficient, and I had experienced that this appearance of ſtate was often very inconvenient.

As ſoon as I was ſettled in my new lodging, I thought of entertaining Mad. Artibacher there, with ſome others of the town, whom I wiſhed to be of the party. The young Count Woronzof, to whom I have many obligations, recommended me to his ſteward on this occaſion, who lived about a mile from Echaterinenburg. He was a very civil intelligent man, and could ſpeak French tolerably well. I begged him to prepare, for the 16th inſtant, the beſt ſupper he could get together, for forty people, but deſired that his wife might be the only perſon in the ſecret. Proviſions were collected from different places: all the preparations were carried on out of my houſe, ſo that even two hours before ſupper, nobody had the leaſt ſuſpicion of this entertainment.

* The baron de Strogonof, the ſenator, has a very fine cabinet of natural hiſtory.

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The ſky had been perfectly clear for ſome days paſt, and was favourable to my project. I went the evening before to ſee M. Artibacher and his lady, and invited them for the next day, to come and ſee the Moon and Jupiter, at ſeven in the evening; and at the ſame time deſired the favor of Mad. Artibacher, to bring all her friends and acquaintance in the town with her. By this behaviour, I intended to make it appear to her that this little treat was purpoſely deſigned for her; I was deſirous, however, that the principal perſons of the town ſhould be preſent, but would not invite one of them.

There are many foreigners, chiefly Germans, in the town of Echaterinenburg: the manners and cuſtoms therefore, of this place, differ much from thoſe of the Ruſſians in the other parts of Siberia, otherwiſe ſuch an entertainment as this would have been impracticable, on account of the women being too cloſely confined.

Madame Artibacher came at the appointed time, with a large company, conſiſting entirely of women: I led her to the place where the teleſcope was fixed, which was at ſome diſtance from the houſe, that the preparations for ſupper might be unnoticed. The men joined us immediately. Being informed that it was neceſſary to have muſic at ſuch entertainments, I had taken care to provide myſelf with a band.

My ſervant came to tell me when all was ready; I then begged the favor of Mad. Artibacher and her company, to reſt themſelves a little at my houſe. As they came in, the muſic ſtruck up. All the company went into the room where the ſupper was, and, from the general ſurprize, I was convinced that the affair had been kept very ſecret. As Mad. Artibacher was the only perſon invited, I withdrew to aſk the reſt of the company in, leſt they ſhould have gone away. There were a greater number of people than I expected, ſo that it was impoſſible for every one to ſit at table. I therefore propoſed, that

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the ladies only ſhould be ſeated, and that the gentlemen ſhould be employed in waiting upon them. However extraordinary this propoſal might ſeem at firſt in Siberia, where, on the contrary, it is the cuſtom for the women to wait upon the men, yet the company came into it: M. Cléopet, a Ruſſian, a ſenſible and agreeable man, aſſiſted me in carrying this ſcheme into execution, which had no inconſiderable ſhare in the pleaſure I expected from this treat. I diſtributed napkins among the gentlemen; and then addreſſing myſelf to Mad. Artibacher, told her, that as ſhe had been ſokind to ſay, ſhe would conſider me as her ſon, the honors of my houſe belonged certainly to her. She anſwered, by a few words in the Ruſſian language, which I underſtood not; but was much ſurprized to ſee part of the company go away immediately, particularly the young people, who ſeemed much inclined to mirth. I was going to ſtop them, when my interpreter prevented me, by telling me thoſe perſons had gone away in conſequence of what Mad. Artibacher had ſaid, which was: *Let thoſe who are entitled to ſtay, ſit down to the table.*

The company, however, was ſo much diminiſhed, that there were ſeveral places vacant, even after the gentlemen were ſeated. All ceremony being ſet aſide, the ſupper paſſed off very agreeably: Mad. Artibacher, as well as M. Cléopet and his lady, were as merry as poſſible. The laſt of theſe ladies was young, lively, fond of mirth and pleaſure. I propoſed a dance after ſupper, and although ſome Ruſſians, certainly old-faſhioned people, ſent for their wives, who were obliged to go, yet we were not baulked of this diverſion: notwithſtanding this unſeaſonable interruption we continued dancing till four in the morning; when the company took their leave, to all appearances, very well ſatisfied.

This trifling entertainment had a greater effect than I could have expected; for my gueſts were ſo well pleaſed, that in re-

turn, the town ſent me the next day the ſtate coach, with ſix horſes, to attend me all the time I ſhould ſtay at Echaterinenburg. The governor came to pay me a viſit, and by his great civilities made me forget what had paſſed before. I went to the principal inhabitants of the town, to return them thanks, and begged the favor of thoſe officers, who ſuperintended the mines, to procure me a ſight of them. It was for this reaſon I had determined to take the route of Echaterinenburg, and to make ſome little ſtay in this town. M. Cléopet was one of the chief directors of theſe mines; he gave me a very high idea of the gold mines, by ſhewing me ſome ſpecimens which were exceedingly rich. The mines are at a few leagues diſtance from the town: we viſited them the next day; ſetting out early in the morning, attended by ſeveral carriages, and many perſons on horſeback. All the morning was taken up in ſeeing the mines. At two o'clock M. Cléopet took me to a ſmall houſe, where he had ordered a moſt elegant dinner. When the dinner was almoſt over, all the young girls of the village were ſent for: they came in their holiday dreſſes, and ſang to us all the time we ſat at the table. After dinner a little ball was given; when obſerving that the company flagged, I took out one of the country girls to dance with me. I was told directly, that it was reckoned the higheſt impropriety in Ruſſia, to dance with a ſlave; ſo that I had no other way of repairing this offence, than by making it become general; and, after a few explanations, the whole company, men, women, farmers, and country girls, danced all together, as uſual in all other countries upon ſuch occaſions. Every body was ſo well pleaſed, that the dancing continued till ſupper-time.

Their muſical inſtruments are the Balalaïca and the violin. The balalaïca is a kind of guittar, which a Ruſſian played upon: The violin is nothing more than a piece of wood, hollowed

hollowed in a very rude manner, and having but three ſtrings made of horſe hair, which, inſtead of roſin, are rubbed with a piece of the bark of the fir-tree, tied to the violin with a packthread. There was, however, a Tartar, who had a more perfect violin. The Ruſſian dances did not ſeem to reſemble any other European dances, except the Allemandes. Sometimes there are a dozen of them dancing together, ſometimes two perſons only, a man and a woman: moſt of their dances are dances of character: theſe appeared to me of a more ancient date, and not to agree in the leaſt with the ſtate of ſlavery in which the women are now kept by the men.

In their dances of character, a lover expreſſes his paſſion for his miſtreſs, by the moſt laſcivious attitudes and motions. His miſtreſs anſwers him with the additional graces peculiar to her ſex; which are the more alluring in theſe women, as the inactive lives they lead, throws a kind of languor over all their motions which gives them more expreſſion and tenderneſs. Sometimes, the woman puts her two hands upon her hips, and looks ſtedfaſtly at her lover ſideways, with a pair of large black eyes; while her head and body are bent to the oppoſite ſide, appearing to refuſe him by this diſdainful attitude. The lover then comes forward in a ſuppliant poſture, his head reclined, his arms folded, and his two hands fixed upon his breaſt: and by theſe ſigns expreſſes ſubmiſſion and ſorrow.

However ſimilar the Ruſſian dances and the Allemandes may be in point of expreſſion and ſprightlineſs, they ſtill differ conſiderably in other reſpects. The Allemandes in general are full of nothing but mirth and pleaſure, and there is commonly much ſpringing up in them: the Ruſſian dances, on the contrary, are carried on upon the level of the ground, and are rather characteriſtic of deſire, than happineſs; they are ſofter and have more expreſſion.

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The Ruſſian dance is ſometimes a kind of pantomime, which requires a great deal of ſuppleneſs and agility. This can only be danced by young people, who go through it with remarkable dexterity: they turn round on one foot, while they are almoſt in a ſitting poſture; they then riſe up in an inſtant, and throw themſelves into ſome fanciful or groteſque attitude, which they vary every moment, in advancing, retiring, or turning round the room. They often dance alone in this manner, or with one woman, who has very little to do.

At ſetting out from Echaterinenburg, nobody had conceived that this entertainment would keep us all day in this place: beſides, I had begged the favor of M. Cléopet to ſhew me the other mines; ſo that it was reſolved, we ſhould paſs the night in this hamlet, that we might go there the next day. It was with great difficulty that matraſſes were procured, and theſe were ſpread in the room where we had ſupped. Some laid themſelves down on them, others ſlept in their carriages. This buſtle and confuſion was far from being diſagreeable to the company, but appeared, on the contrary, to renew their chearfulneſs. We went back to Echaterinenburg next day, where I was invited to different entertainments by the principal inhabitants. I ſtayed here ſome time, in order to make ſome aſtronomical obſervations, and to make myſelf better acquainted with the mines, of which I ſhall give an account hereafter.

Echaterinenburg is a ſmall town, founded by Peter the Firſt, in 1723; it is under the juriſdiction of Tobolſky, and is the center of all the mines and founderies in Siberia; ſo that the inhabitants are chiefly perſons employed in theſe mines, and are moſt of them Germans. Society is upon a more agreeable footing here than in any other town of Siberia, becauſe the manners of the people are more ſimilar to thoſe which prevail throughout the reſt of Europe.

There is one governor in the town, whoſe authority is only over the military. All other affairs, as well as all things relative to the mines, are adjudged by the chancery; which has the general direction of all the mines in the neighbourhood, as of thoſe at Solikamſky, Caſan, and Orenburg, whether they belong to the crown or to individuals. The chancery has the ſame powers and appointments as a governor, and is only ſubordinate to the Imperial College of the mines at St. Peterſburg. The chancery has nothing to do with the mines of Colivan and Nerczinſk; theſe have their particular juriſdictions.

There are five juriſdictions under the court of chancery at Echaterinenburg; theſe are called factories. The buſineſs of theſe juriſdictions is to regulate matters of right, taxes, working of the mines, their revenue, and the account of the value of the crown lands. The ſovereign keeps a manufactory for the working of marble and porphyry. Cornelians and ſardonyxes are likewiſe poliſhed here, as alſo a brown cryſtal, found in the neighbouring mines. This work is carried on by means of different machines, put in motion by water.

The garriſon conſiſts of three or four hundred men. There is an hoſpital here, an apothecary's ſhop, and different houſes for the cuſtoms, and for the ſale of brandy. The officers who have the direction of theſe laſt eſtabliſhments, form a department, which is called the Commiſſariat; but this is ſtill ſubordinate to the chancery.

Peter I. had ordered the eſtabliſhment of a ſchool in this place, where young people were to be inſtructed in the Latin, German, and Italian languages, in mathematics and drawing; but I found neither maſters nor ſcholars here, even the clergy being unacquainted with the Latin tongue. This eſtabliſhment is now reduced to one ſchoolmaſter, whoſe ſalary is fixed at one hundred rubles, or five hundred French livres.

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This ſchoolmaſter was one of the perſons who did me the honor of a viſit juſt after my arrival. Altho' he was ſixty years of age, yet he was ſo lively that I was ſurprized. He often addreſſed himſelf to me, but as I did not underſtand the Ruſſian language, and that I was alſo much taken up in receiving the company, I could not poſſibly hold a converſation with him.

This ſchoolmaſter came again to ſee me at my return from the mines, and told me, he was the grandſon of a French refugee. His grandfather, whoſe name was Mouiſſet, had been a captain in the French guards, who had retreated into Ruſſia upon the revocation of the edict of Nants. I went the next day to ſee him in his little cottage. He was married, and had four or five children. The good man expreſſed the higheſt joy at having a Frenchman in his houſe: he was no otherwiſe acquainted with our nation and manners, than by the tradition of his anceſtors, who never ſpoke to him on this ſubject, he ſaid, without tears, which alſo flowed involuntarily from him upon this occaſion. I was much affected with his ſenſibility. He related to me all he had been obliged to undergo, before he could obtain that moderate ſufficiency he now enjoyed. We then entered into ſome diſcourſe on the recalling of the edict of Nants, when he told me, in a rage, that Father la Chaiſe had managed that affair, and that France would be ruined by the Jeſuits. I could not certainly have given him a greater pleaſure, than to have told him of the expulſion of the Jeſuits from that kingdom, which happened about that time; but having left my country in 1759, I had not yet been informed of that event. At the ſame time that this ſchoolmaſter's anceſtors had tranſmitted to him their averſion to the Jeſuits, they had alſo taken care to give him ſome knowledge of geometry and drawing: he was employed in taking the plan of the mines, and in bringing up the young people. I

was ſo well pleaſed with this Frenchman, and ſo much affected with his ſituation, that I regretted much that it was not in my power to take him away with me. Beſides, he was contented with his little income, and was much reſpected by the Ruſſians. He had a ſmall garden, which he cultivated himſelf, and which ſupplied him with all kinds of vegetables. He offered me ſome of them, aſſuring me, I ſhould find them no where elſe. I accepted them with the more pleaſure, as I had never met with any during my ſtay in Siberia.

I continued a few days longer at Echaterinenburg, which I quitted on the 20th inſtant, after having ſatisfied my curioſity upon the ſeveral things I had intended to notice. I was now going to croſs a long chain of mountains, which obliged me to alter my plan of travelling, and to leave my large carriage, with which it would have been impoſſible to aſcend theſe mountains. Inſtead of this, I got ſeven ſmall carts, called quibiks, which are the only carriages uſed in Ruſſia for baggage. They are very ſmall, and therefore but ſlightly laden; as it would otherwiſe be impoſſible to travel in this country, on account of the badneſs of the roads. Theſe freſh diſpoſitions, the neceſſity of which I had not foreſeen, would have detained me conſiderably at Echaterinenburg, if Count Woronzof had not been ſo kind to give me the letter I mentioned before; but with the aſſiſtance of his ſteward, and of M. Clépet, ſuperintendant of the mines, my wants were readily ſupplied. I travelled pretty conveniently the firſt day; but as I advanced upon the chain of mountains, the roads became worſe; beſides, I was in want of four or five and twenty horſes, and could not always get ſuch a number.

We met with ſeveral fortified places in the courſe of our journey over theſe mountains. The fort of Grobowa is in the midſt of the chain; and that of Aſtchitzkaia, which is the laſt, is in the plain. Theſe forts are nothing more than wooden towers

towers ſurrounded with paliſades. They have been conſtructed to keep the Baſkirs in awe, whom the Ruſſians have had ſo much trouble to ſubdue; for, till then, they had imagined themſelves to be merely under the protection of Ruſſia, and not ſubject to its power.

After the chain of mountains is paſſed over, the country becomes very open, inſomuch that I met with none but ſmall hills, ſuch as are found upon every plain. The trees are ſcattered here and there in cluſters: I ſaw no other than the lighter woods here, chiefly birch.

I arrived on the 23d at the forge of Souxon, where I ſtopped, in order to learn ſomething about the mines of copper in the neighbourhood, which I knew to be very curious. As I had no recommendation to the director, I did not expect to be very graciouſly received, nor to be allowed the liberty of ſatisfying my curioſity; ſo that I made the carriages halt upon a graſs-plat, without unharneſſing the horſes. The director, although a polite man, was rather ſhy of permitting me to go over the forges, and examine the different works going on there. At laſt, one of M. Dimidof's workmen in this manufactory, who had ſeen me at Solikamſky, recollected my face, and told his maſter of it. This new manufactory belonged alſo to M. Dimidof, by whoſe orders I had been perfectly well received at Solikamſky. The director being informed of theſe circumſtances, came up to me, while I was employed in examining the ores, which had been heaped up together in a yard; he made me a number of excuſes for his reſerved behavior, and I went over all the moſt intereſting places with him again. I then thought I was going away, inſtead of which I found myſelf at his houſe, where he had got my carriages conveyed, and where he had ordered a handſome dinner to be got ready. As he was a man well verſed in his own department, and well acquainted with the country, he furniſhed

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me with many uſeful obſervations in geography, as well as on the mines, and led me, after dinner, into a room, where he had repoſited the moſt curious pieces of ore. Theſe conſiſted in a heap of wood mineralized by a diſſolution of copper. They appeared exceedingly beautiful to the eye, from the variety of colors theſe woods exhibited; and were ſtill more curious upon a nearer inſpection, on account of the ſeveral cryſtallizations formed in them. I could not contain the exceeding pleaſure this ſight afforded me; which the Ruſſian perceiving, began to think himſelf in poſſeſſion of a treaſure. I picked out ſeveral pieces of theſe woods, and my choice did not certainly light upon the leaſt beautiful amongſt them. But the director, who at firſt appeared to take a pleaſure in offering them to me, ſeemed now to be rather diſſatisfied with my freedom: I perceived this, and took away only a few ſmall pieces. I deſired him, however, not to build his own or his maſter's fortune upon this collection, which was indeed very curious to a naturaliſt, but of little intrinſic value. I went away extremely pleaſed with all the civility I had received from the director of this foundery, and arrived at Tikonoſka on the 24th, at four in the morning. I found it ſo difficult to get horſes at this place, that I could not get away before nine o'clock. Almoſt as ſoon as I came out of this village, I diſcovered another chain of mountains, riſing almoſt imperceptibly. The ſpace between the firſt chain and this, is merely an extenſive plain, on which ſome few hillocks are to be found. The ſoil was cultivated in ſome places only, where, however, nothing but barley was ſown; at leaſt I did not ſee any other kind of grain.

The road grew worſe as we advanced in this ridge of mountains, which appeared to me, in all reſpects, different from the former chain, where the mountains were ſometimes elongated and of an eaſy aſcent: theſe, on the contrary, although rather

rather low, were ſo ſteep that it was difficult to get up them; the ſoil was alſo changed here. From Tobolſky to this ſecond chain, the earth had appeared black and greaſy; but in theſe laſt mountains, it was yellowiſh and more hard.

I was very near being killed, at the diſtance of a few leagues from Birna, by the careleſſneſs of a poſtilion. The drivers in Ruſſia, ſo far from taking care gently to deſcend the little mountains they meet with, as is cuſtomary in all other parts of the world, come down from them, on the contrary, at full ſpeed. They croſs the interval between two little hills at the ſame rate, and ſoon reach the top of the oppoſite mountain; but if they ſhould happen not to clear the interval completely, it is impoſſible to prevent the carriage from being broken to pieces, as the horſes cannot be ſtopped at this inſtant. Having croſſed the river Tourka, I went up a ſmall mountain, which I ſoon after deſcended on the oppoſite ſide. The road was winding, and upon the brink of a precipice: my coachman galloped down this mountain ſo faſt, that not having taken care to turn ſhort enough in an angle of the road, the horſes loſt the track, and I expected to ſee both the carriage and horſes tumble down the precipice. It happened luckily, that one of the horſes fell, I immediately ſprang out of the carriage, and ſeized the others by the reins. As we were inſtantly aſſiſted, this event turned out to be of no other conſequence to any body but the coachman, whom his companions ſeized without my perceiving them, and took him to the wood, where they layed him flat on the ground, and were beating him ſo unmercifully with ſticks, that they would certainly have killed him, if I had not intervened, on hearing him cry out. I ordered him a glaſs of brandy, and the moment after, he was as merry as before his puniſhment. He got up again on the coach box, ſinging, and thinking no more of what had happened; ſo that notwithſtanding this diſcipline, and the ſtrict

charge I gave him, to go gently down the hills, he was ſtill inclined to gallop down them: I was therefore obliged to take a ſtick into my carriage, to prevent him; and, whenever we were going down a hill, I reſted the ſtick upon his ſhoulders, to caution him againſt going faſt.

At length I came to Birna, a village inhabited by Tartars; many of whom came out to meet me, at the diſtance of a werſt from the village, expreſſing, by ſigns, their great deſire to ſerve me. It was evident, from the candor and tranquillity obſervable in their countenances, that theſe profeſſions were ſincere; ſo that I followed them without any apprehenſions. They placed themſelves before my carriage, and conducted me to the houſe of the chief perſon in the village, who was held in great eſtimation among them: his merit and his virtues had entitled him to rule over them, without the form of an election. They had prepared a kind of dinner for me, conſiſting of honey, butter, and a few vegetables. Their houſes are as neat, as thoſe of the Siberians are dirty. In other reſpects they live nearly after the ſame manner, except that they are Mahometans.

Their dreſs has ſome reſemblance to that of the Ruſſians. The Tartars wear a woollen jacket, which they bind with their girdle; over this they have a full long robe hanging looſe and flowing. They always have boots on. Their heads are ſhaved, except on one ſpot at the back part, which they cover with a ſmall piece of leather. They wear a cap edged with fur. They are tall, ſtrong, and well made; and their dreſs is perfectly becoming. Notwithſtanding the mildneſs of their countenances, they have ſtill the appearance of a warlike and independent people; and have indeed preſerved their former privileges. In war-time, they furniſh the Ruſſians with a certain number of troops, which are kept in pay by the latter.

The



J.B. le Prince del

C. Grignion sculp.t

Russian Sledges, used for Travelling, & for conveying Baggage, Provisions &c. in Winter.



Habit of a Tartar in Kasan subject to Ruſsia.



Habit of a Tartarian Woman in Kasan subject to Russia.

The dreſs of the Tartar women differs but little from that of the men; it is ſhorter, and they wear the girdle above the robe. Their head-dreſs is a cap, ſometimes made in form of a ſugar loaf, and covered with copecs and glaſs beads; a large piece of cloth faſtened to the back part of the cap, and hanging down below the waiſt, is ornamented in the ſame manner. They wear boots, and might be taken for men at firſt ſight; if not diſtinguiſhed by their head-dreſs. They ſhare moſt of their huſbands labours, by whom they are very mildly treated, and there is not the leaſt ſuperiority on either ſide. The married women ſeemed to enjoy a perfect freedom: the girls on the contrary are much confined; but notwithſtanding the watchfulneſs of fathers and mothers, they contrive to ſlip away upon ſome occaſions, which they make the moſt of. In Siberia, the married women are confined, and the girls left more at liberty, which they alſo do not fail to take advantage of, as we have before obſerved, ſo that in all theſe countries the girls ſeem to be very troubleſome.

The dreſs of the Ruſſians differs from that of the Tartars, inaſmuch as the firſt wear a kind of waiſtcoat inſtead of a tunic, and that they often leave their ſhirts hanging out of their breeches. Over the waiſtcoat, they wear a kind of jacket with a girdle. They have no boots, but wrap up their legs in cloth, which they faſten from the bottom with a cord. Their ſhoes are commonly made of the bark of trees. All the common people of Ruſſia have kept their beards, and they all wear caps. The dreſs of the Tartars is in every reſpect preferable to that of the Ruſſian men: the firſt is elegant, but the latter ſcanty. The ſame cannot be ſaid of the dreſs of the women. That of the Tartar women is generally more rich, but not always ſo pleaſing. The Ruſſian women, when at home, wear above their ſhifts a tunic, which reaches down to their heels, and is buttoned at the fore-part. When they go out of doors, they put

on a gown over this, and ſometimes a mantle. Their head-dreſs is more like a hat than any thing elſe, and is uſually ornamented with copecs and glaſs beads. The girls dreſs in the ſame manner, excepting only that they have never any caps on, and that they only bind their heads with a kind of ribband.

When I left Birna, the Tartars doubled my number of horſes, on account of the mountains we were to croſs, without making any difference in the price; neither would they accept of any conſideration for the entertainment they had given me.

The roads became terrible at a ſmall diſtance from this village; for although the mountains were but ſmall, yet they were ſo ſteep, and the rain had made them ſo ſlippery, that notwithſtanding the utmoſt efforts of the poſtilions, and the draught of the greater number of our horſes fixed to one carriage, yet we were ſtill ſcarce able to gain the top of the mountain, although every one of us was on foot. On our coming to other mountains, the ſame difficulties occurred, which were the more fatiguing both to men and horſes, as each carriage required the ſame management. Mine being the lighteſt, I took the lead, in order to ſend aſſiſtance to the reſt from the next hamlet; but I could not get farther than a mile beyond the place where I left them.

I was then on the borders of the river Tourka, in a bottom ſurrounded by mountains; where the watchmaker and my interpreter ſoon came up with me. Having waited here two hours in vain for the other carriages, I ſent back ſome Tartars to them, with ſome of the horſes I had taken with me.

The other carriages appeared at one in the morning: I had left the poſtilions ſome flambeaus, which they had lighted, and which made me diſcern them from afar. The Tartars, who had ſtayed along with me, then went to meet them, and in order to give them light, they ſet fire at certain diſtances to the

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Habit of the Wife of a Ruſsian Boor.



Habit of a Ruſsian Boor.

fir-trees they met with on the road. Theſe trees, which were very lofty, catching the flame in an inſtant, were of great ſervice to them, and at the ſame time exhibited a remarkable and curious ſight, appearing like ſo many fire-works lighted upon the ſlopes and upon the tops of theſe mountains. I had all the carriages placed round a fire, and the horſes were faſtened to pickets in the rear. I diſtributed ſome brandy among the people, and we all eat a very hearty ſupper. After having reſted themſelves for an hour, my people ſet about mending the carriages, while I laid myſelf down by the fire upon a bear's ſkin: I ſlept very little, and riſing a few hours after, I went to take a view of theſe mountains, while they were getting ready to march. From the beginning of this chain, I had as yet ſeen no other than birch-trees on the road, but at the diſtance of ſix werſts from the place where I had paſſed the night, I had met with fir-trees all around, as in the former chain of mountains; but with this difference, that theſe trees were much thicker, very lofty, and appeared to thrive well; ſo that theſe two chains ſeemed to differ entirely with reſpect to the ſoil and the produce; the earth is rather of a yellowiſh than black colour.

I ſet out at ſeven in the morning, and immediately got upon a very high and very ſteep mountain. We had a great deal of trouble in getting up to the top of it, becauſe of the rain that fell, which made the way ſo bad, that the men, although on foot, could hardly climb up. At length we arrived about noon at the poſt of Piſſe; a hamlet on the borders of the river which bears the ſame name, and ſituated near the end of the chain. Here again I met with fir-trees all about, and the ſoil was ſtill yellowiſh. The firs were from three to five feet in diameter, and near fourſcore feet high. The wood was very thick, on account of the number of plants and ſhrubs with which it abounded; when, on the contrary, in the firſt chain, eſpecially

in the neighbourhood of Echaterinenburg, the earth was bare, and the fir-trees we ſaw were very low, ſtunted, and did not thrive well.

From the beginning of this ſecond chain I had not ſeen any of the ground cultivated, as it is in the confines of Piſſe, where the country begins to be more open. The corn, which had been lately ſown, was already more than two inches high, and was therefore farther advanced than at Tobolſky, at the beginning of July. I only ſtopped at this hamlet to change horſes, and reached Oſſa about three in the afternoon. This is a ſmall town on the borders of the river Kama; part of it is ſituated on an eminence, with a ſlight fortification. Oſſa is in the midſt of a very open plain, which is almoſt entirely cultivated. When I left this place, I travelled along the borders of the Kama, and at two leagues from hence, got again into the woods, which I had quitted nearly at the ſame diſtance on the other ſide of the town. The rain had made the roads extremely bad. I did not reach Cracova till one in the morning, although I had travelled all night by the light of flambeaus. Finding no horſes in this hamlet, I reſolved to paſs the night there. A large fire was kindled in the middle of the ſtreet, and all my people laid themſelves down on ſtraw round about it. I had my matraſs carried into the neareſt houſe, where I ſlept. I roſe very early, and going down into the ſtreet, found all my attendants faſt aſleep: they ſeemed to be ſo happy, that I let them ſleep on till day-break. I mended their fire, which was almoſt out, looked at the carriages, and went away at eight o'clock. At noon, I came to the borders of the Kama. This river, which we croſſed in a ſmall boat puſhed on by oars, appeared to be more than one hundred toiſes over: we were eighteen minutes in croſſing it with four oars. I was aſſured, it was thirty or forty feet deep. The croſſing of this river is very dangerous, on account of the ſmallneſs of the



Habit of a Woman of Wotiac in Siberia

the ferry uſed for this purpoſe. The large carriages muſt be placed acroſs the boat, ſo that if there was not the greateſt care taken to prevent their ſlipping, the boat would tip over upon the leaſt motion. When I had paſſed the Kama, I was in hopes of travelling in better roads, and a more populous country: it had already froze twice, ſo that the mornings were very cold. The ground was covered every morning with hoar-froſt; the leaves fell from the trees; and the fruits dropped from their ſtalks, ſo that the roads were covered with them. Every circumſtance foretold the approach of winter, and nothing was to be ſeen, but the melancholy green of the firs. I was ſtill at the diſtance of four or five hundred leagues from St. Peterſburg, and as I feared being overtaken by the winter, I made very few ſtops. I arrived on the 28th at Sowialova, after having experienced ſeveral accidents; and upon one of theſe occaſions, two of my ſoldiers had been hurt.

Sowialova is a hamlet inhabited by the Wotiaks. I reſolved to ſpend part of a day with theſe people, on account of their ſingular appearance and dreſs. Some authors have reckoned them among the Tartars, but I could not obſerve the leaſt analogy between the two nations. The Wotiak men and women, in general, are no more than four feet, a few inches high, and are of a very weak and delicate conſtitution. The dreſs of the men is the ſame as that of the Ruſſians; but the dreſs of the women has not the leaſt reſemblance to thoſe I have ſeen in Siberia. They wear a ſhift of coarſe linen, ſlit at the boſom like a man's ſhirt; and hemmed at this opening with thread or worſted of different colors. There is alſo a little ornament of a triangular figure wrought on the right ſide of the ſhift. Their gown is woollen, and bears a great reſemblance to the habit of the Jeſuits in college; the ſleeves of the upper gown are ſlit in the middle, to give paſſage to the arms; and the lower part of the ſleeve generally hangs down.

down. This gown, which reaches down to the legs, is faſtened at the fore-part merely by a girdle, curiouſly wrought. They wear alſo coarſe cloth ſtockings and ſandals, the ſame as the Ruſſians. Their head-dreſs is very remarkable: they firſt wrap up their heads with a towel, over which they faſten, with two ſtrings, a kind of helmet, made of the bark of a tree, and ornamented at the fore part with a piece of cloth and with copecs. This helmet is afterwards covered with a handkerchief, wrought with thread or worſted of various colors, and edged with a fringe. This head-dreſs is above one foot high. Their hair is divided into two treſſes, which fall down upon the breaſt with a necklace, ſuch as the Tartars wear. One of my attendants, being deſirous of examining this necklace, opened one of theſe women's ſhifts in ſuch a manner as to uncover all her breaſt, at which ſhe was ſo far from being diſpleaſed, although it was done in public, that ſhe laughed at his curioſity.

M. Strahlemberg thinks theſe people ſome of the moſt ancient in Siberia *. They have profeſſed Chriſtianity for ſeveral years paſt, but are ſo ignorant, that they have not the leaſt idea of this religion. The Ruſſians ſent them prieſts, and ſome troops, to convert them. I found a Ruſſian miſſionary at Sowialova, who was deputed to inſtruct and baptize them. Although he was unacquainted with their language, he nevertheleſs made Chriſtians of them; ſo that they ſtill adhere to all the ſuperſtitious parts of their religion.

As I was deſirous of purchaſing one of the women's dreſſes, one was brought me, which they ſold me for about a guinea. As ſoon as the people of the village were acquainted with this circumſtance, they got together, and claimed the dreſs back again; for they looked upon this as a ſacrilegious bargain,

* Tom. ii. page 153.

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Habit of a Woman of Wotiac in Siberia



Habit of a Samoyede Woman & Child subject to Russia.

the punishment of which would fall on the village, because they are obliged, by the articles of their religion, to bury the women with their cloaths on. The woman from whom I had bought the dress, was called upon to answer the charge brought against her: she owned, she had sold it; but alledged in her defence, that it belonged to her late mother, who lived at the time they were made Christians, when the Empress had forbidden them to bury the dead with their cloaths on. The woman was acquitted; but the Wotiaks were still inclined to make me return the dress; which I should not have been able to keep, without the assistance of the soldiers, who were put in a posture of defence.

The Wotiak women are generally very ugly, and more slovenly than any other people of the north, accept the Samoyedes, according to the account I received of them from Russians who have travelled in that province. The Samoyedes never wear any shift: their dress is made of the skin of the reindeer, in form of a bag. Their stockings are of the same skin, and they sometimes wear sandals, according to the Russian fashion. A Russian, who has travelled among the Samoyedes, made me a present of one of these dresses, from which the plate was taken.

I did not get away from Sowialova till it was very late; I then went through several hamlets, inhabited by Wotiaks and Tartars, and on the 29th, at eight in the evening, reached the borders of the river Wiatka. The method of crossing this river is upon a bridge, made of two boats, pushed on by oars. This river is not so wide as the Kama, but the stream is more rapid, and the passage so dangerous, on account of the rocks, that the watermen would not go over with us because the wind was too high. I determined therefore to pass the night on the banks of the river. A large fire was lighted; I had a kind of tent built up with branches of trees; and, after supper, I laid

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myſelf down on a bear's ſkin. About midnight I awaked, quite frozen and covered with ſnow: at firſt, I knew not whether I was in a dream; but the ſnow fell all night, ſo that in the morning, it lay above half a foot deep on the ground. I croſſed the river on this moving bridge in twelve minutes. The quantity of ſnow which had fallen, had made the roads ſo bad, that I could not reach the hamlet Scynd, without the utmoſt difficulty, although every body travelled this ſhort poſt on foot, in order to eaſe the horſes. I was very undetermined about the manner of purſuing my journey, and ſpent the greater part of the morning, conſidering whether I ſhould quit my carriages and take to ſledges, or whether I ſhould ſtill run the riſque of going on with my wheel carriages. This laſt ſcheme appeared to be attended with ſome danger; but on the other hand I was aſſured, that I ſhould find no ſnow when I came near Cazan, and ſhould therefore be obliged to quit my ſledges.

I ſet out at laſt with my wheel-carriages, although it ſnowed very hard: the number of my horſes was doubled; ſo that I had now two and forty of them. I fed them with plenty of oats; and diſtributed brandy among the poſtilions, and by theſe helps arrived at Sicchi the ſame day, at ten in the evening, notwithſtanding the extreme badneſs of the roads. In the courſe of this day's journey, I paſſed through ſeveral villages inhabited by Tartars, whoſe dreſs differs in ſome particulars from that of the Tartars of Siberia: theſe people were more poliſhed, but they ſtill preſerved the ſimplicity and purity of their manners.

As I came nearer to Cazan, the ſnow diminiſhed; and diſappeared entirely at Wiſcogora. Here are extenſive meadows, in which the graſs, puſhed up a ſecond time, diſplayed the verdure of the ſpring: the face of the country became every inſtant more pleaſing, and the ſky more ſerene; the hoar-froſt had not yet deprived the trees of their leaves; and I ſaw,

for the firſt time ſince my arrival in Ruſſia, ſome oaks in the neighbourhood of Cazan, and ſome fruit trees in places ſomething like orchards, inſtead of the frozen lands of Siberia, and the deſerts full of firs, and ſcarcely inhabited by any thing but animals, moſt of which are unknown in Europe. I now travelled upon little hillocks cut acroſs pleaſant groves, whoſe ſhade I ſought for, as much as I wiſhed to avoid it a few days before. The fruitfulneſs of the country was apparent from the richneſs of the villages; in which we met with gardens ſkilfully laid out, and ſtill adorned with flowers. Every object then reminded me of my coming nearer to my own country; an agreeable recollection, of which none can be ſenſible, except thoſe who have experienced it.

I arrived at Cazan the firſt of October; where a Tartar Prince was the governor, who received me very graciouſly: he had ordered an apartment to be got ready for me; but M. Weroffchin, a Ruſſian, whom I had the honor of ſeeing at St. Peterſburg, had been ſo kind as to give me a lodging at his houſe, to which I was conducted.

The next day I waited upon the governor; after a few compliments had paſſed, which I did not underſtand, we ſeated ourſelves round a table covered with a beautiful carpet; on which were placed four large pipes and a china bowl, full of Chineſe tobacco: I ſmoked for a few minutes. After this ſome *liqueurs* of the country were ſerved up, with ſweetmeats, fruits and a water melon; which laſt fruit is ſo exceedingly delicious here, that I eat nothing elſe. Melons are in great plenty at Cazan; and never do any hurt, how much ſoever one may eat of them. I found this fruit ſo much better than any I had ever met with of the kind any where elſe, that I brought away ſome of the ſeeds, but they did not anſwer in France.

The archbiſhop ſent to deſire me to come down to his country houſe, ſituated in the neighbourhood of the town; and was

ſo obliging as to ſend ſeveral carriages to convey me and my attendants. I there got acquainted with a prelate, well verſed in the ſciences, in hiſtory and literature; and deſerving the high veneration he is held in all over Ruſſia: he was the only clergyman I met with in theſe extenſive dominions, who did not appear to be aſtoniſhed at my coming from Paris to Tobolſky, in order to obſerve the Tranſit of Venus.

I ſtopped ſeveral days at Cazan, and made ſome aſtronomical obſervations there; contributing to determine, with preciſion, the poſition of this city, which ſtill retains ſome marks of its former affluence, although its trade is almoſt come to nothing. The houſes are very well built, notwithſtanding they are moſt of them made of wood. There is a great deal of nobility here, who live upon a very agreeable footing among themſelves. All the neceſſary and uſeful things of life are in great plenty, even game, fiſh and fruits. White bread is alſo here in uſe, which is as little known in Siberia, as pine apples are. Wine alone is very ſcarce at Cazan, but the people have a method of making it with various kinds of fruits: this wine does not differ much from the natural juice of the grape either in color or in taſte; but is very unwholſome, on account of the brandy, which is the baſis of it.

The manners are as different from thoſe of Siberia, as the climate. The women do the honors of their table, and add to the agreeableneſs of the company, of which they are a part, as at Moſco and St. Peterſburg.

A great many of the inhabitants of Cazan are Tartars; who are ſo far from being perſecuted there, that, on the contrary, they are treated with the utmoſt conſideration; ſo that they are firmly attached to their ſovereign. They have preſerved the innocence of their manners, their probity, and their truth; and are moſt of them poſſeſſed of ſmall fortunes. Their dreſs is much richer than that of the other Tartars I have

already

already ſpoken of: the dreſs of the women is even different in ſome reſpects, chiefly with regard to their head; for I never ſaw any caps there in form of a ſugar loaf. Their head-dreſs is very ſimilar to that of the Ruſſians, except that they have jewels and pearls intermixed with their hair. They alſo make ornaments of the ſame kind, ſome of which they put upon the ſleeves of their gowns; others are faſtened round the neck, and hang down upon the breaſt.

The city of Cazan is very large and well peopled. M. de Schouvalof, one of the greateſt patrons of literature in Ruſſia, had perſuaded the Empreſs Elizabeth to eſtabliſh a Gymnaſium, or ſchool there for the education of youth. M. Werofkin, a Ruſſian, had the direction of it: he had eight Profeſſors under him; two for the French, two for the German, two for the Latin, and one for the Ruſſian language; and one fencing-maſter, who at the ſame time taught dancing. The ſalaries of theſe Profeſſors, were one hundred and fifty roubles, or ſeven hundred and fifty French livres. Notwithſtanding the ſmallneſs of theſe ſalaries, all theſe different languages and exerciſes are taught with great ſucceſs, by the attention and management of M. Werofkin. He was a man of ſcience, and joined to all his learning the art of knowing how to manage men who were placed in a ſtate of ſubordination to him; and of training up properly the youth entruſted to his care: he was a man of uncommon talents, and very fit for the ſituation he was placed in; in which, however, for the misfortune of this riſing ſchool, he did not long continue. His diſtinguiſhed merit had raiſed him enemies among thoſe who were engaged in the ſame purſuits. Envy and jealouſy haunted him every where. Although he was at the diſtance of four hundred leagues from the capital, yet they were continually perſecuting him: and the plots laid againſt him were ſo much the more ſucceſsful, as while he was employed at Cazan in being

uſeful to his country, he knew not from what quarter they came, or was not at hand to guard againſt them. In the moſt enlightened parts of the world, envy and jealouſy are enemies from whom men of letters have moſt to fear, but they are leſs dangerous than among nations of ignorance. In a learned ſociety, the poiſon of envy and jealouſy ſtings at laſt thoſe perſons from whom it came, and the man of ſuperior talents always gets the better; but in ignorant countries, the men of ſome little knowledge are more intereſted in pulling down the man of ſuperior talents; and as the unknowing country muſt be guided by the firſt claſs of men, it generally coincides with their iniquitous deſigns. M. de Schouvalof, who was M. Werofkin's patron, and the Empreſs Elizabeth's favourite, had always protected him. When that Empreſs died he loſt his influence; and M. Werofkin immediately became the victim of envy: he would have been very happy, if at the ſame time that he loſt his place, he did not add to the number of the unfortunate people of Siberia.

I looked every where about the neighbourhood of Cazan, for the famous plant called borametz, which M. l'Abbe Lambert ſpeaks of, in his civil and natural hiſtory. According to that gentleman's account, this plant reſembles a lamb, having all the parts of that animal, with a very delicate fleece, which the women uſe as a covering to their heads. The plant is furniſhed with a ſmall portion of blood and fleſh: has no horns, but a tuft of wool in imitation of them: it lives and feeds as long as there is green graſs about it; but this zoophyte, or animal plant, decays as ſoon as the neighbouring graſs is dried up.

It cannot be imagined that M. Lambert took all theſe abſurdities for granted, his intention in mentioning them, was certainly merely to engage travellers, to examine from whence this ridiculous fable could poſſibly have ariſen. Notwithſtanding my endeavours, I could not procure any of this plant,

plant, which is unknown at Cazan. It is to be ſeen in the King's gardens, and ſome writers have claſſed it among the moſſes, but it does not agree in any particular with the ſtory given by M. Lambert.

I left Cazan at four in the afternoon, and reached the banks of the Wolga by eighteen minutes after ſeven. The river appeared to be about two hundred toiſes over in this place; and I was told it was ten toiſes, or ſixty feet deep. The weather was calm; and the waters of this river, which is one of the fineſt in Europe, were not in the leaſt agitated. I croſſed the ſtream in a boat, pulled by ſix watermen, and was ſeventeen minutes going over. I was told at Tobolſky and at Cazan, that a great number of pirates were to be met with hereabouts, and even that the people uſed to amuſe themſelves with ſhooting them as they did ducks; but I never ſaw any of theſe pirates, although I travelled the ſpace of a hundred leagues along the borders of this river. On the 8th inſtant, I arrived at Kuſmodemianſk, after having paſſed through a country inhabited by another ſet of people called Schuwachi. Their dreſs is nearly the ſame as that of the Ruſſians; they profeſs Chriſtianity, but are as ignorant as the Wotiakes; and have, in the ſame manner, adhered to all their ſuperſtitions.

At Kuſmodemianſk, I came into the ſame road I had taken to go to Tobolſky: the nearer I came to St. Peterſburg, which lies more northward, the more ſenſible was I of the cold from one day to another, and the greater difficulties did I meet with in travelling with wheel-carriages: ſome rivers were already frozen over: at length, however, I arrived at St. Peterſburg on the 1ſt of November, 1761. I ſpent the winter in this city with the Baron de Breteuil, who treated me with infinite kindneſs. I embarked in the ſpring, as ſoon as the ſea would admit of it, in order to return to France, where I arrived in the month of Auguſt, 1762, near two years after my firſt ſetting out from thence.

Of GEOGRAPHY.

OUR knowledge in geography is ſtill very much circumſcribed. In the year 1761, we had determined the exact ſituation of a few places only, in the whole courſe of the diſtance from Straſburg to Tobolſky, which is between fourteen and fifteen hundred leagues. M. Caſſini de Thury, in his journey to Vienna, has rectified ſeveral poſitions, between the borders of France and this capital of Auſtria, by geometrical obſervations. Ruſſia has been the chief object of my inquiries, becauſe it is leſs known than any of the other countries I have paſſed through.

My determinations of the geography of this country are founded on aſtronomical obſervations, made only on the places I was obliged to paſs through on the road; becauſe it is impoſſible to trace a map of Ruſſia, merely from ſuch information as may be gathered from the inhabitants, eſpecially with regard to places from which they are at any diſtance. I was the more careful in making my obſervations on the places through which I paſſed, as the Ruſſian maps of the Atlas, publiſhed in 1745, give but a very imperfect ſketch of the geography of this country, where one may travel ſometimes near a hundred leagues together, without finding the poſition of one of theſe places, throughout ſuch an extent, mentioned in theſe maps. The road from Cazan to Oſſa is an inſtance of this; although it lies partly through a very populous country, where there are poſts erected from mile to mile, on which the diſtances are marked.

This Ruſſian atlas, imperfect as it is, does credit to thoſe who publiſhed it, and would of itſelf alone be a monument

ſufficient to immortalize the memory of Peter the Firſt. Before this great man came to the throne, an attempt to acquire the leaſt knowledge of this empire, was puniſhed with death. Since the reign of that monarch, the academy of St. Peterſburg has collected ſeveral important materials towards compleating the geography of Ruſſia: ſome able perſons have been employed for ſeveral years paſt in arranging them; and the public will certainly ſoon reap the benefit of their labours.

Of France, and its Frontiers.

I might perhaps have omitted giving any account of the geography of this kingdom, as moſt of the maps are in print; but theſe are not in every one's poſſeſſion: beſides, that it will be of uſe for the reader to have before his eyes the diſpoſition of my route, together with the level I have reduced it to.

Each chapter is divided into three parts. The firſt contains a table of the longitudes and latitudes, moſtly aſcertained from aſtronomical obſervations; the ſecond, a journal of my route; and the third, the geographical accounts I have thought it neceſſary to give. The longitudes and latitudes diſtinguiſhed by aſteriſks *, have been determined with the greateſt nicety by aſtronomers of repute.

Thoſe marked with a croſs †, are leſs certain; and thoſe which are not marked, are taken upon the credit of travellers.

The ſecond column of the following table, marks the difference of the meridians between that of the royal obſervatory at Paris, and the meridians of the place of which the poſition is given. The longitudes are determined with reſpect to the iſlands of Ferro, and I have ſet down the longitude of Paris at 19 degrees, 53 minutes, 45 ſeconds, according to the laſt obſervations of the academy.

TABLE

TABLE of the longitudes and latitudes of some parts of France and its Frontiers.

Names of the Places.	Difference of the Meridians. H.	M.	S.		Longitudes. D.	M.	S.	Latitudes. D.	M.	S.
Abbeville	0*	2	1	West	19	24	0	50*	7	1
Altorf	0*	35	25	East	28	45	0	49	17	38
Angiers	0*	11	35	W.	17	0	0	47*	28	8
Avranches	0*	14	51	W.	16	11	0	48*	41	18
Auxerre	0*	4	57	E.	21	8	0	47*	47	54
Basil	0	21	0	E.	25	9	0	47	35	0
Besançon	0*	14	50	E.	23	39	0	47*	13	45
Bitche	0*	20	25	E.	25	0	0	49*	2	28
Bourdeaux	0*	11	39	W.	16	59	0	44*	50	18
Brest	0*	27	23	W.	13	3	0	48*	23	0
Caen	0*	10	47	W.	17	12	0	49*	11	10
Chalons on the Marne	0*	8	9	E.	21	56	0	48*	57	12
Chartres	0*	3	24	W.	19	3	0	48*	26	49
Cherbourg	0*	15	53	W.	15	56	0	49*	38	26
Coutances	0*	15	10	W.	16	7	0	49*	2	50
Dijon	0*	10	50	E.	22	36	0	47*	19	22
Dole in Bretany	0*	16	25	W.	15	48	0	48*	33	9
Evreux	0*	4	45	W.	18	43	0	49*	1	24
Francfort on the Maine *	0	25	0	E.	26	9	0	50*	6	0
Granville	0*	15	48	W.	15	57	0	48*	50	11
Ingolstadt †	0*	36	10	E.	28	57	0	48*	47	0
Landau	0*	23	10	E.	25	42	0	49*	11	40
Lisle	0*	2	57	E.	20	38	0	50*	37	50
Mayence	0	24	0	E.	25	54	0	49	54	0
Meaux	0*	2	10	E.	20	27	0	48*	57	37
Metz	0*	15	24	E.	23	45	0	49*	7	5
Munich ‡	0*	37	13	E.	29	12	0	48*	9	55
Nancy	0*	15	26	E.	23	46	0	48*	41	28
Nantes	0*	15	35	W.	16	0	0	47*	13	17
Noyon	0*	2	43	E.	20	35	0	49*	34	37
Orleans	0*	1	43	W.	19	28	0	47*	54	4
Paris	0*	0	0		19	53	45	48*	50	10
Reims	0*	6	52	E.	21	37	0	49*	14	36
Rennes	0*	16	8	W.	15	52	0	48*	6	45
Rouen	0*	4	59	W.	18	39	0	49*	26	43
Saint Malo	0*	17	29	W.	15	32	0	48*	38	59
Saint Omer	0*	0	20	W.	19	49	0	50*	44	46
Saint Paul de Leon	0*	25	21	W.	13	34	0	48*	40	55
Seez	0*	8	41	W.	17	44	0	48*	36	21
Senlis	0*	1	0	E.	20	9	9	49*	12	23
Sens	0*	3	48	E.	20	51	0	48*	11	56
Soissons	0*	3	58	E.	20	53	0	49*	22	32
Strasburg	0*	21	45	E.	25	20	0	48*	34	35
Toul	0*	14	15	E.	23	28	0	48*	40	27
Tours	0*	6	35	W.	18	15	0	47*	23	44
Troys	0*	7	0	E.	21	39	0	48*	18	2
Verdun	0*	12	11	E.	22	57	0	49*	9	18
Versailles	0*	0	51	W.	19	41	0	48*	48	18

* M. Cassini de Thuri has determined the latitude of this town, in 1762, at 50 degrees 6 minutes, instead of 49 degrees 55 minutes, as it had been always reckoned. Voyage de M. Cassini, en Allemagne, page 22. † Ingoldstadt. Voyage de M. Cassini, page 139. ‡ Munich. Ibidem.

TABLE, containing a journal of the road from Paris to Breſt, and to Tobolſky in Siberia.

Names of the places.	Leagues of 2000 toiſes.	Names of the places.	Leagues of 2000 toiſes.	Names of the places.	Leagues of 2000 toiſes.
From Paris to Breſt.		Saint Brieux	2	Jaalons	2 1/4
		Chatelaudrin	5 1/4	Matougues	1
Paris from the Obſervatory		Guingamp	3 1/4	Chalons	2 3/4
Nanterre	3 1/4	Goiſmormant	2 1/4	Chepy	2 1/2
Saint Germain	1 1/4	Belliſle	2 1/2	La Chauſſée	2 1/2
Triel	3 1/4	Pontir	2 1/4	Saint Amand	1 1/4
Meulan	2	Pontou	2 1/4	Vitry le François	3
Mantes	3 3/4	Morlaix	4	Faremont	2 3/4
Bonnieres	3 1/4	Saint Egone	2	Perthé	2 1/4
Pacy	4	Landiviſiaw	2 1/4	Saint Dizier	2 1/2
Evreux	4 1/2	Landernau	3	Saudrup	3 1/4
La Commanderie	4 1/2	Quipava	3	Bar-le-Duc	3
La Riviere	4 1/2	Breſt	2	Ligny	4
Marché-neuf	2 1/2			Saint Aubin	2 1/4
L'Hottêllerie	3 1/4	From Paris to Straſburg.		Void	3 3/4
Liſieux	3 1/2			Laye	3
Saint Aubin	2 1/2	Paris Obſervatory		Toul	2 1/2
River Diva	2	Bondy	3 3/4	Velaine	3
Moult	3 1/4	Vergalant	2	Nancy	3
Caen	4 1/2	Claye	2 1/4	Vic	7 1/2
Mouen	2 3/4	Meaux	3 3/4	Chateau Salins	1 1/2
Villers-le-Bocage	3 3/4	Saint-Jean	2 3/4	Hellimer	9
Saint Martin	4 1/2	La Ferté	2 1/4	Sarreguemine	6 3/4
Pont-Farcy	4 1/2	Montreuil	2 1/2	Bitche	7 1/2
Ville-Dieu	4 1/2	Vivret	2 1/2	Goetzbruck	2 1/4
Avranches	5 1/4	Chateau Thierry	1 3/4	Grebentenberg, mt.	1
Pont-Orſon	5	Pavoy	2 1/4	Keſleberg, mt.	0 1/2
Dole, reckoned to Breſt	5	Dormans	2 1/2	Vimmenau	0 3/4
Dinant	6	Port à Binſon	2 1/4	Bouxveiller	3 1/2
Jego	5	La Cave	1	Brumptein	5 1/4
Lambale	4	Epernay	2 3/4	Straſburg	4 1/4
Etangles	2	Plivot	2 1/4		

From this journal it appears, that the diſtance from Paris to Breſt is 145 leagues of 2000 toiſes each, or 127 leagues of 2282 toiſes, which make the 25th part of the mean degree of the meridian, which I ſuppoſe to be 1,570,060 toiſes; and the diſtance from Paris to Straſburg is 137 leagues of 2000 toiſes each, or one hundred and twenty leagues, reckoning 25 to a degree.

Of Germany and its Frontiers.

At Ulm I embarked on the Danube for Vienna; and in this paſſage traced the courſe of this river with great exactneſs, determined its windings with a compaſs, and computed the diſtances with a watch that marked the ſeconds.

TABLE of the longitudes and latitudes of ſome parts of Germany and its frontiers.

Names of the places.	Difference of the meridians.			Longitudes.			Latitudes.		
	H.	M.	S.	D.	M.	S.	D.	M.	S.
Alba regalis	1	5	10	36	12	0	47	13	0
Agria	1	11	30	37	47	0	47	42	0
Breſlau	0	59	15	34	42	0	51	3	0
Bude	1†	9	52	37	22	0	47†	28	0
Caſchau	1	4	30	38	32	0	48	27	0
Dillingen	0*	31	38	27	49	0	48	30	0
Grats	0	52	44	33	5	0	47	17	0
Lints	0	46	30	31	31	0	48*	16	0
Neuſtat	0	56	58	34	9	0	47	58	0
Nurenberg	0*	34	56	28	38	0	49†	26	0
Olmuts	1	0	49	35	6	0	49	43	0
Paſſau	0	42	50	30	37	0	48	30	0
Peſt	1†	9	55	27	25	0	47†	29	0
Polling (1)	0*	35	0	28	39	0	47*	48	8
Preſburg	1	0	33	35	2	0	48	8	0
Ratiſbon	0	38	25	29	30	0	49	2	0
Saliſburg	0	41	30	30	17	0	47	34	0
Tyrnau	1*	0	55	35	8	0	48*	23	30
Vienna	0*	56	10	33	57	0	48*	12	32
Vilna	1	35	25	43	15	0	54	24	0
Ulm	0	30	25	27	30	0	48	23	0

(1) Voyage de M. de Caſſini en Allemagne, page 140.

TABLE,

TABLE, containing a journal of the road from Paris to Tobolsky in Siberia, Strasburg, Vienna, and Bilitz.

Names of the places.	German miles of 3804 toises.	French leagues of 2000 toises.
Strasburg		
Kehl	1	2
Bischoffheim	2	3
Stollhofen	2	3
Rastadt	2	3
Etlingue	2	3
Pforzheim	3	5
Enzweig	3	5
Calstadt	3	5
Blochingue	2	3
Goeppingue	2	3
Geisling	2	3
Westerstoedten	2	3
Ulm on the Danube	3	5
Gienzburg	3	5
Diling	3	5
Donawest	4	7
Neuburg	3½	6
Ingolstat	3	5
Neustat	3½	6
Ratisbon	5	10
Straubin	4½	9
Dekendorf	4	7
Vilshoven	4	7
Passau	4	7
Effertingen	9	17
Lints	3	5
Spilberg	3	5
Iten	3	5
Waltse	0½	1
Greyn	2	3¾
Wirpel	1	2
Ips	2	3¾
Marbach	1	2
Molch	2	3¾
Wiendorf	2½	4¼
Crems	1½	3
Stokerau	7	13½
Koreiburg	1½	3
Klauster-Neuburg	0½	1½
Vienna	2¼	4¼
Wolkersdorf	3	5¾
Gaunersdorf	2	3¾
Boysdorf	3	5¾
Nickolsburg	2	3¾
Porlitz	3	5¾
Brunn	3	5¾
Wischau	4	7½
Kremsier	4	7½
Bistritz	3	5¾
Meseritsch	2	3¾
Neutischein	2	3¾
Friedeck	4	7½
Teschen	3	5¾
Skotschau	2	3¾
Bilitz	2	3¾
From Westerstoedten to Vienna by land.		
Westerstoedten		
Elchingen	2	3¾
Guntzburg	2	3¾
Sommerhausen	3	5¾
Ausburg	3	5¾
Degenbach	3	5¾
Oberbruck	3	5¾
Munich	4	7½
Anzing	3	5¾
Hag	3	5¾
Ampfing	3	5¾
Oetting	3	5¾
Markel	2	3¾
Braunau	2	3¾
Altheim	2	3¾
Reit	3	5¾
Haag	2	3¾
Lambach	3	5¾
Vels	2	3¾
Lints	4	7½
Ens	3	5¾
Strenberg	2	3¾
Amstoetten	3	5¾
Kemmelbach	2	3¾
Molck	3	5¾
Poelten	3	5¾
Persling	2	3¾
Siegharts-Kirche	2	3¾
Bourkersdorf	2	3¾
Vienna	2	3¾

The distance from Westerstoedten to Vienna, passing by Ulm, and following the course of the Danube, is 169 leagues of 2000 toises each; by land it is 144: and the distance from Strasburg to Vienna is 215 leagues of 2000 toises.

In this journal I have set down the German mile at 3804 toises, supposing that there are fifteen of these miles in a

 degree,

degree, and computing the mean degree of the meridian at 57,060 toiſes of the ſtandard meaſure of Paris.

According to this journal, the diſtance from Straſburg to Bilitz, following the courſe of the Danube, is 294 leagues of 2000 toiſes, and 258 leagues computed at 25 to a degree, which league I reckon at 2282 toiſes.

After having croſſed the black mountains, which are parallel to thoſe called Voſgi, we paſs by Wirtemberg. This country, although generally flat, is divided by a number of ſmall hills. The mountains of the Danube begin about the neighbourhood of Ulm, at the diſtance of a few leagues: theſe mountains are nothing more than hills at firſt; they become imperceptibly cloſer to each other, and are gradually elevated, as one proceeds to Vienna. The bed of the Danube is ſometimes conſiderably ſtraitened between theſe two ridges of mountains, which at other times are ſeparated at ſeveral leagues diſtance, and form large baſons.

From the ſummit of theſe mountains may be ſeen thoſe of Bohemia to the north, and thoſe of Tirol to the ſouth: theſe laſt are a branch of that large chain, which riſes from the ſea-ſide in Galicia, croſſes part of the globe from weſt to eaſt, in going from Spain through France and Switzerland, and afterwards extends as far as China.

I have been told by people of the country, that the mountains of the Danube were not ſo high as thoſe of Bohemia, and that the mountains of Tyrol were higher than all the chains known in Germany. I paſſed within a few leagues of the Carpathian mountains which begin eaſtward of Vienna. Theſe appeared to me higher than thoſe of the Danube: in ſome maps they have been confounded with mountains ſituated weſtward of the river Oder. But theſe are entirely different from the others: as they only form hillocks on the Poliſh road, or ſmall eminences very little raiſed above the

ground: they riſe as they come nearer the mountains of Bohemia, of which I imagine they are a branch. I have placed a ridge of mountains on the borders of the Danube about Buda; but having not been able to ſatisfy myſelf thoroughly upon this point, this ridge requires farther confirmation. I learned at Vienna, that the mountains which paſs to the north of Alba-regalis and to the eaſt of Gratz, and which unite themſelves to the chain of the Danube, were as high as thoſe which are on the borders of this river.

Of Poland, and its Frontiers.

The maps of Poland are exceedingly imperfect. There is not, throughout the whole extent of this kingdom, one place, the ſituation of which is determined by aſtronomical or geometrical obſervations.

Staniſlaus Poniatowſki, King of Poland, as well verſed in the knowledge of the ſciences, as in the art of government, undertook to have maps of all his dominions traced, ſoon after he came to the throne. The Marquis de Montalembert, of the academy of ſciences, took upon him the direction of this work, which will be the more uſeful, as the compilers of it have been employed, for ſeveral years paſt, in ſettling the ground-work of theſe maps by aſtronomical obſervations.

I have made out the journal of my route, by conſulting people of the country. The names of the places have been looked over by ſome Poles of great knowledge; but I have been obliged to take the poſitions from thoſe in the antient maps, and have not had time enough to make all the obſervations neceſſary to determine them with the accuracy I could have wiſhed. I have taken, as I went along, ſketches of the mountains or rather hillocks, I met with on the road, and the reſt have been

drawn

drawn from the informations I endeavoured to acquire in travelling through this kingdom.

It is evident from the journal in the following table, that the diſtance from Bilitz to Riga, is 293 leagues of 2000 toiſes, and 257, reckoning 25 leagues to a degree.

About the confines of Brünn, ſome little hills are ſeen; theſe become higher at Friedeck, which is but a few leagues diſtant from the Carpathian mountains. Theſe hills are carried on as far as Cracow, but leſſen as they are more diſtant from the Carpathian mountains. The road from Cracow is one large plain to Grodno, at which place the little hills make their appearance again; they become higher and more numerous as far as Kowno. As I went out of the road to Lithuania, on coming from Ollita, I paſſed through Guezno, Ponorei and Podſtrava; and met with great difficulties in going through this part of Lithuania, on account of the number of mountains; although they are of ſo little height that they may be conſidered merely as riſing grounds: all the reſt of Poland is no more than one plain as far as Riga.

TABLE, containing a journal of the road from Paris to Tobolſky in Siberia, Bilitz, Warſaw and Riga.

Names of the places.	German miles of 3804 toiſes.	French leagues of 2000 toiſes.	Names of the places.	German miles of 3804 toiſes.	French leagues of 2000 toiſes.	Names of the places.	German miles of 3804 toiſes.	French leagues of 2000 toiſes.
Bilitz			Nadarzyn	2	3	Ollitta	4	7
Zator	5	9	Warſaw	4	7	Pren	4	7
Cracow	5	9	Okonaw	3	5	Gog	3	5
Iwanowa	3	5	Staniſlawoie	3	5	Kowno	3	5
Zarnowice	4	7	Wegrow	6	11	Bopt	3	5
Naglowice	4	7	Granne	5	10	Kieydan	3	5
Malagoſzoz	3	5	Pirdeleiova	1	2	Montwyde	3	5
Radoſzyce	5	9	Branſk	4	8	Beyſagola	3	5
Konſkie	3	5	Bielſk	3	5	Roginian	3	5
Inowlodz	5	9	Bialiſtok	5	9	Mozeyki	3	5
Rawa	4	7	Sokolka	6	11	Kraki	4	7
Chrzconorwice	2	4	Grodno	6	11	Mitau	5	9
Mſzczanowa	2	4	Rotnica	6	11	Riga	6	11
Zabiawola	2	3	Merecz	4	7			

Of

Of Livonia and Eſtonia.

The geographical meaſures of Ruſſia are werſts, which are each divided into 500 ſagens, or fathoms, and each fathom into three arcins.

The arcin is 26 inches, 6 lines, and three tenths, according to the Paris royal foot *: the ſagen is ſix feet, 7 inches, 6 lines, and 9 tenths: the werſt is 552 toiſes, 7 inches, and 6 lines; 103 werſts and one third are equal to one degree of the meridian, which I compute at 57,060 toiſes.

TABLE, containing a journal of the road from Paris to Tobolſky in Siberia, Riga, and St. Peterſburg.

Names of the places.	Werſts of 552 toiſes.	French leagues of 2000 toiſes.	Names of the places.	Werſts of 552 toiſes.	French leagues of 2000 toiſes.	Names of the places.	Werſts of 552 toiſes.	French leagues of 2000 toiſes.
Riga			Knitas	21	$5\frac{3}{4}$	Waivota	17	$4\frac{1}{2}$
Nevermuhlen	11	3	Uddern	23	$6\frac{1}{4}$	Narva	20	$5\frac{1}{2}$
Hilchensfer	14	$3\frac{3}{4}$	Derpt	24	$6\frac{1}{2}$	Jamburg	21	$5\frac{3}{4}$
Engerharſdof	18	4	Igafor	22	6	Opole	15	4
Roop	21	$5\frac{1}{4}$	Torma	22	6	Cyrkowicie	24	$6\frac{1}{2}$
Lenzenhof	20	$5\frac{1}{2}$	Nenal	24	$6\frac{1}{2}$	Koſkowa	21	$5\frac{3}{4}$
Wolmar	18	$4\frac{3}{4}$	Kanſk	16	$4\frac{1}{4}$	Kipina	19	5
Stackel	19	5	Kleinpungern	22	6	Gorieloi	20	$5\frac{1}{4}$
Gulber	20	$5\frac{1}{2}$	Pourroi	15	4	St. Peterſburg	21	$5\frac{3}{4}$
Teiglis	17	$4\frac{1}{2}$	Fockenhof	16	$4\frac{1}{4}$			

According to this journal, the diſtance from Riga to St. Peterſburg is 146 leagues of 2000 toiſes each, or 128, allowing 25 leagues to a degree; there are no mountains to be met with in all this extent.

* This reſult is taken from what was ſettled between M. Deliſle and M. Winſheim, in the month of March 1738, in conſequence of a commiſſion for regulating the weights and meaſures. The arcin of Ruſſia was compared with the French foot, ſent from Paris, by M. de Mairan of the academy of ſciences.

Of Ingria, Ruſſia, and Siberia, as far as Tobolſky.

TABLE of the longitudes and latitudes of ſome places in Ruſſia.

Names of the places.	Difference of the meridians.			Longitudes.			Latitudes.		
	H.	M.	S.	D.	M.	S.	D.	M.	S.
Cazan	3*	7	38	66	48	15	55*	47	22
Echaterinenburg	3	55	0	78	40	45	56*	51	42
Iſland of Ago	1†	18	20	39	28	45	58*	56	0
Moſco	2*	20	53	55	7	0	55*	45	46
Narva	0	0	0	0	0	0	59*	23	27
Nova-Uſolia	3†	36	52	74	6	45	59*	23	54
Revel	1	27	50	41	51	15	59*	26	22
Riga	1†	25	15	41	12	30	56*	56	24
Saigatka	3†	24	38	71	3	15	56*	43	15
St. Peterſburg	1*	52	0	47	53	45	59*	56	0
Sarapul	3†	22	38	70	33	15	56*	26	45
Tobolſky	4*	24	18	85	58	15	58*	12	22
Veretia	3†	37	1	74	9	8	59*	22	41
Uſt-Ykſkoi	3	18	38	69	33	15	55*	51	50

If theſe longitudes and latitudes are compared with thoſe of the beſt maps extant of Ruſſia, it will be found, that there are ſometimes errors in theſe of one degree and a half in the longitudes, and of half a degree in the latitudes. The ſame errors are alſo obſerved in the Ruſſian maps themſelves ‖. I have been attentive to theſe differences in the maps of my journey; but I cannot flatter myſelf ſo far, as to ſuppoſe, that I have not committed any other errors, in attempting to rectify the antient geography by theſe new obſervations.

‖ According to the Ruſſian Atlas, the longitude of Saigatka is 72 degrees 31 minutes; and its latitude 57 degrees 12 minutes.

TABLE, containing a journal of the road from Paris to Tobolſky in Siberia; St. Peterſburg, Moſco, and Tobolſky.

Names of the places.	Werſts of 552 toiſes.	French leagues of 2000 toiſes.	Names of the places.	Werſts of 552 toiſes.	French leagues of 2000 toiſes.	Names of the places.	Werſts of 552 toiſes.	French leagues of 2000 toiſes.
St. Peterſburg			Murom	30	8¼	Oſſa	35	9¾
Iſchora	35	9¾	Monakhova	25	7	Piſſe	20	5½
Toſna	23	6¼	Pogoſt	29	8	Birma	54	15
Loubana	26	7¼	Bogorodzkoe	39	10¾	Tikonoſka	32	8¾
Tſchoudoiwa	32	8¾	Niſan-Novogorod	30	8¼	Orda	16	4¼
Spakoi	25	7	Zimenki	25	7	Sabarca	20	5¼
Podbereſchie	23	6¼	Tatinets	31	8½	Souxon	10	2¾
Novogorod	22	6	Belozericha	35	9¼	Solotoukouſka	13	3½
Bronitſkoi-ïam	35	9¾	Fokino	29	8	Baikoiva	17	4¾
Zaitſowo	30	8¼	Soumka	34	9½	Aſtchitzkaia	20	5½
Kreſteſkoi	31	8½	Kuzmodemianſk	20	5¼	Biſertzkaia	20	5½
Jachelbiza	39	10¾	Eſkeren	30	8¼	Klenouſkaia	25	7
Zimnegorſkoi-ïam	23	6¼	Czebakſcar	26	7¼	Kirgiſchanſkaia	29	8
Jedrowa	22	6	Coſki	30	8¼	Grobowa	23	6¼
Chotillowſkoi-ïam	35	9¾	Ilineva	31	8½	Bilimbaeuſkoi	23	6¼
Wyſzneiwoloczok	36	10	Weſovaïa	23	6¼	Echaterinenburg	52	14¼
Vidropuſk	33	9	Cazan	27	7½	Koſulina	21	5¾
Torjok	36	10	Wiſocogora	20	5½	Belojarſkaia	24	6½
Mednoie	33	9	Schurillena	29	8	Volkava	25	6¾
Twer	28	7¾	Sumacourſa	23	6¼	Kamyſchlowſka	22	6
Gorodnia	37	10¼	Sicchi	22	6	Kroſnoiarka	22	6
Zawidowo	21	5¾	Louga	27	7½	Pyſchmintkaïa	14	3¾
Klin	27	7½	Scynd	20	5½	Kuiarowkaia	14	3¾
Pieſzki	30	8¼	Soromacou	25	7	Belecoſkſou	44	12
Tcherna ïa	24	6½	Neſnimacan	25	7	Demenova	12	3¼
Moſco	28	7¾	Caccy	25	7	Malſchova	39	10¾
Dereunia-Novaïa	35	9¾	Derichova	22	6	Tumen	36	10
Bounkova	26	7¼	Jouſki	40	11	Sozonowa	46	12¾
Kirjana	29	8	Sowialova	25	7	Pokrowſkaia	31	8½
Lipni	28	7¾	Zaſerin	35	9¾	Iſtinſka	35	9¼
Undola	17	4¾	Caſachewa	30	8¼	Wakſarina	34	9½
Wolodimer	22	6	Bapka	20	5½	Cheſlakova	26	7¼
Soudogda	35	9¾	Reſeſtoinka	15	4¼	Dekhetereva	36	10
Mochok	30	8¼	Cracow	20	5½	Tobolſky	43	11¾
Dratſchewo	26	7¼						

TABLE, containing a journal of the road from Paris to Tobolſky in Siberia, through Kuſmodemianſk and Solikamſky.

Names of the places.	Werſts of 552 toiſes.	French leagues of 2000 toiſes.	Names of the places.	Werſts of 552 toiſes.	French leagues of 2000 toiſes.	Names of the places.	Werſts of 552 toiſes.	French leagues of 2000 toiſes.
Kuſmodemianſk			Solovetſkoie	33	9	Martinſkaja	25	6¾
Bolcaja	10	2¾	Troiſkoie	22	6	Jaiwa	35	9½
Koumia	50	13¾	Kroutogowſkoi	25	6¾	Moltchana	35	9½
Choumetri	30	8¼	Jekatorinſkoi	25	6¾	Roſtefs	37	10¼
Carewokokſzaiſk	30	8¼	Tikowſkaja	35	9½	Paiudinſka	40	11
Polovinoi-vrag	50	13¾	Loenſkoie	25	6¾	Melechina	40	11
Jaranſk	40	11	Kaigorodok	35	9½	Lialinſkoi	22	6
Voſkreſenſkoie	34	9½	Volva	34	9½	Verchaturia	42	11½
Ichernaia	47	13	Berezowka	25	7	Saldinſkoi	27	7½
Kotelnich	46	12¾	Jouſſinewſkoe	30	8¼	Makhneva	37	10¼
Jouriewſkoie	20	5½	Zezewſkaia	15	4¼	Fomina	28	7¾
Orlow	26	7¼	Koſineſkoie	36	10	Babikhina	53	14½
Bouitriſkoe	21	5¾	Loginova	32	9	Tourinſk	53	14½
Chlinow	30	8¼	Sirinſkoe	28	7¾	Sladkaia	50	13¾
Slobodſkoi	28	7¾	Nikonowa	25	7	Rogeſtuenkoie	50	13¾
Prokofiewſkoi	30	8¼	Solikamſky	30	8¼	Tumen	51	14

By this journal it appears, that the diſtance from Kuſmodemianſk to Tumen is 433 leagues of 2000 toiſes each, and from St. Peterſburg to Tobolſky 859 leagues; whereas, from St. Peterſburg to Tobolſky, by Cazan, is no more than 782 leagues of 2000 toiſes, or 685 leagues at 25 to a degree.

From theſe different journals, the following diſtances are aſcertained in leagues of 2282 toiſes, or 25 to a degree.

From Paris { to Breſt - - - - - - - - - 127
to Straſburg - - - - - - - - 120
to Vienna, following the courſe of the Danube 308

This

This laſt diſtance, and the following, are fifteen leagues leſs going by land.

From Paris	to Warſaw - -	467
	to St. Peterſburg - - -	762
	to Tobolſky, by Cazan -	1447
From Breſt to Tobolſky - -		1574

All the road from St. Peterſburg to Moſco, an extent of 200 leagues, is one continued plain, except at Waldai, where there are mountains in the middle of the road, which however are nothing more than hillocks, or riſing grounds. The road, as far as Moſco, is almoſt entirely made with pieces of deal wood, three, four and five inches thick; ſometimes they are made with faggots placed along ſide each other, and covered with earth four or five inches thick, but there is no earth laid upon the deal. When the road is ſpoiled, a new one is made by the ſide of the other.

A great quantity of wood is uſed in this method of making the roads; and indeed nothing but cluſters of fir-trees are to be met with throughout this ſpace, which in other reſpects is fine, and cultivated, eſpecially in the neighbourhood of Moſco, and the bridges are alſo kept in good repair; but after this town, the roads are very bad. From St. Peterſburg to Waldai the ground is raiſed only about 45 toiſes above the level of the ſea: it riſes all at once to about 200 toiſes. Moſco is in a large plain, elevated 259 toiſes above the level of the ſea.

Wolodomer is ſituated on a hill bordering the river Kliazma. There is an archbiſhop belonging to it. The river is nearly as broad as the Seine, and the hill not more than 30 toiſes above the level of the river, the borders of which are marſhy, as is likewiſe the whole plain as far as Murom. Almoſt all the ground lying between theſe two towns is uncultivated: no-

thing but ſand is be ſeen there, and fir-trees, which are moſt of them ſtunted and do not thrive well.

Murom is a ſmall town, partly ſituated on a mountain, about 20 toiſes above the river Occa, which is 100 toiſes over, and 4 deep.

The Wolga is one of the fineſt rivers in the known world. The ſouthern ſide of it is bordered by a hill from Niſan-Novogorod to Kuſmodemianſk. All the ground to the ſouth of this river is raiſed about 50 toiſes above the level of the ſtream; and is extremely well cultivated throughout this plain as far as Cazan: there is very little wood to be met with in this part, and the people are ſometimes obliged to fetch it from ten leagues diſtance; while there are nothing but immenſe foreſts to be met with northward of the river.

Cazan is the loweſt of all the places upon the road from Moſco: the ground riſes immediately as one goes to the north. At ſome diſtance from Cazan the beauty of the country diſappears, and gives place to foreſts of fir-trees. The ſoil is not much cultivated; it forms a plain as far as the river Kama, which one muſt croſs over to get to Cracow, where the mountains begin.

Before one comes to Cazan, there is another road at Kuſmodemianſk leading equally into Siberia: this was the way I went in going to Tobolſky: the road is very little cultivated except in the neighbourhood of Chlinow. There are nothing but thick foreſts to be ſeen as far as Solikamſky, ſituated on the borders of the Kama, where the chain of mountains, known by the name of Poias Zemnoi, begins.

I croſſed theſe mountains at this place as I was going to Tobolſky, and paſſed over them again at my return by Echaterinenburg, Oſſa and Cracova, ſix leagues more to the ſouth. I took drawings of the ſeveral mountains on theſe two roads;

I determined

I determined their heights with the barometer, and their diſtances with my watch, which marked the ſeconds.

This chain of mountains is forty leagues broad at Solikamſky. In going from this town, the mountains continue riſing to the middle of the chain: from whence they diminiſh immediately, ſo that they are made ſhelving on both ſides with a ridge in the middle. The higheſt part is at Jaiwa and near Kiria. At the firſt of theſe places the ground is 376 toiſes above the level of the ſea, and at the laſt, the mountain of Kiria is 440 toiſes; but, as the river Kama is 187 toiſes above the level of the ſea, it follows, that theſe mountains are not raiſed to any conſiderable height above the ground they ſtand upon; but their aſcents are very ſteep. There are ſometimes plains of ſeveral leagues upon the ſummits of theſe mountains.

I paſſed by the way of Echaterinenburg on my return from Tobolſky to St. Peterſburg. Here the chain begins to the eaſt of Echaterinenburg: it riſes as it comes nearer the middle, and terminates at the Fort Biſertzkaia. It is about 40 leagues long; but theſe mountains did not appear ſo high as the others: they were not more than about 250 toiſes high about the middle. The mountain of Klemouſkaia was 309 toiſes. After this chain, a plain of more than 20 leagues follows, and then a freſh chain appears, the mountains of which, riſe by imperceptible degrees towards the middle; they afterwards leſſen and terminate on the borders of the Kama. This ſecond chain is not more than about 30 toiſes wide. The higheſt mountains are 212 and 287 toiſes; and the level of the river at Oſſa being 153 toiſes above the level of the ſea, it follows, that theſe mountains are not raiſed more than about 150 toiſes above the ground they ſtand upon.

The chain of the Poias mountains, or rather the middle of this chain, is pointed out in all the maps; but the ſecond chain, which muſt be traverſed in going to Oſſa, and which is continued

along

along the eaſtern border of the Kama, is no where to be found. Having ſtopped ſome days at Solikamſky and at Echaterinenburg, I had an opportunity of acquiring all the information I wiſhed for, with reſpect to this country, which is pretty well known between theſe two towns, on account of the Mines, and the number of perſons frequently paſſing from one to the other. I had beſides ſome particular plans, on which I marked all the obſervations that occurred to me, or that were communicated by others, concerning the places where it was not poſſible for me to go. I have mentioned nothing from my own obſervations, but what I met with in the courſe of the route; and there is not one ſingle mountain, the deſign of which has not been taken upon the ſpot: thoſe which are out of the road, have only been repreſented from the informations I was able to gather in the country. All theſe mountains are covered with fir-trees. The woods have been omitted in the maps, to make them leſs confuſed. I ſaw the ſecond chain only at the place where I croſſed from Orda to Oſſa: it is totally different from the chain of Echaterinenburg: I have carried it on, along the eaſtern border of the Kama, without being able poſitively to aſcertain, whether it is really continued ſo far. The Poias mountains are a continuation of the Rymnic mountains, and the new chain appears to me to be a branch of the ſame, which joins the Poias mountains in the neighbourhood of Kongour. This opinion is founded upon the following reaſons.

The chain which I croſſed in going from Orda to Oſſa, is continued towards the ſouth; I ſaw it myſelf from the road, after I had paſſed the Kama, and was told by all perſons I converſed with on the ſubject, that it went on in the ſame direction; but I have not been able to get much information about that part which extends towards Menzelinſk. All the mountains expreſſed in my maps near this place, have only been

been drawn from analogy to what I had ſeen: there is no other authority for them, and I cannot even venture to affirm, that this chain of mountains is continued towards the ſouth, in the manner I have expreſſed it, but it appears probable to me that it is; beſides, that this circumſtance ſeems to be indicated by the courſe of the river Kama. For, if we follow the courſe of this river on the map, we ſhall ſee that it is directed from weſt to eaſt towards its ſource, and that the chain of the Poias mountains makes it form ſuddenly a right angle at Solikamſky, and turns its courſe towards the ſouth, in an oppoſite direction to the chain. The ſame chain throws it again out of its natural courſe at Oſſa; and it is probably by the ſame means that it returns to the weſt, where it opens into the Wolga.

After having paſſed this chain, the reſt of the way to Tobolſky is nothing but one plain full of marſhes.

Before I finiſh this article, I ſhall make ſome obſervations on the limits of Aſia and Europe. Some modern geographers had fixed them, with M. Gmelin, on the river Oby; but this opinion has not been adopted by the majority: beſides, that it was founded upon a ſuppoſition of imaginary lines being drawn acroſs ſome large deſarts. The limits marked out by the Poias mountains, which in that caſe divide Aſia from Europe, have been judged more proper; although it has been neceſſary, in adopting theſe limits, to trace ſome imaginary lines in ſeveral places, either for want of being ſufficiently acquainted with theſe chains of mountains, or from their not being continued from the frozen ſea to Mount Caucaſus, of which they appear to be a branch. Whatever is the reaſon, theſe limits are ſtill very doubtful in ſome places. They may, however, be naturally traced by the ſtreams and rivers bordering theſe chains of mountains, in the way M. de Strahlenberg has determined them. For, ſetting out from the mouth of the river Don, in the black ſea, and following its courſe as far as

the 49th degree of latitude, there is only one line of ten leagues, drawn over the Wolga at Tſarichin, where this ſtream makes almoſt a right angle. The eaſtern border of the Wolga may afterwards ſerve as a boundary, as far as the mouth of the Kama, which muſt then be followed to the mouth of the Koiwa. This laſt river would fix the boundary as far as the place where its ſource begins; the river Peczora would then be found at the diſtance of five leagues directly northward, and this might determine the limits as far as the frozen ſea, into which it opens. This boundary, fixed by nature, leaves no uncertainty behind it, and will limit, almoſt every where, the chain of mountains which divides Aſia from Europe.

Of the level of the road from Paris to Breſt, and to Tobolſky in Siberia: and of the uſe of the barometer in obtaining a level of the globe.

THE internal parts of the earth, ſo far as we are acquainted with them, are compoſed of different layers of earth, ſand, marl, clay, calcareous and vitrificable ſtones. In all theſe layers ſea-ſhells are found, ſometimes collected into heaps, which are extended throughout whole provinces. All theſe layers, produced by the ſediments which have been depoſited by the waters, in the various changes the globe has undergone, exhibit appearances correſponding to theſe changes, in the ſeveral mountains, plains and valleys; which appearances, determine the order of theſe revolutions and their reſpective periods: but the ſolution of theſe problems requires a previous knowledge of the height of theſe different layers, with reſpect to one common level, the angle of inclination they fall into in the mountains, the direction of their ſlope, the ſituation of metals, minerals, and of all the materials produced by animal and vegetable ſubſtances, as alſo the height of the mountains, and the rivers, with their ſlopes.

The additional knowledge we acquire by the levelling of the globe, comprehends the hiſtory of nature, and furniſhes us with the moſt intereſting diſcoveries in all branches of ſcience.

The uſe hitherto made of the barometer in levelling, has been chiefly confined to the determination of the different heights of mountains, undoubtedly, becauſe of the difficulties ariſing from the variation of the atmoſphere: the height of a mountain indeed is meaſured in a few hours, and it is an eaſy matter either to know what changes the atmoſphere has under-

gone in ſuch a ſpace of time, or to make proper allowances for them. But when the barometer is uſed for the levelling of the ground, every circumſtance ſeems to concur in aſſiſting to produce falſe concluſions. The variations of this inſtrument in Europe, are about two inches, and therefore, the reſults in theſe countries are liable to ſimilar errors, when obſervations made at the ſame time, in places far diſtant from each other, are compared: but, in ſmall diſtances, the variations of the atmoſphere being generally uniform in a given extent of country, very accurate reſults may be obtained, if care is taken to compare the barometers, and to allow for the trifling difference almoſt always to be obſerved in theſe inſtruments. And indeed, from obſervations made at the ſame time at Perpignan and at Paris, it has been found, that the variations of the atmoſphere have been nearly the ſame in theſe two places *. This hypotheſis is confirmed by the obſervations made at Paris, and in the province of Auvergne, upon Mount Dor †, by thoſe made at Genoa ‡, in Spain, Italy, and England §. I have alſo eſtabliſhed the validity of this opinion by a ſeries of obſervations I have made at Bitche, and by others at Breſt and at Paris at the ſame time. I think therefore, I may venture to affirm, that the variations of the atmoſphere are generally uniform in a diſtance of about 150 leagues, and conſequently that the reſpective height of two places, at ſuch a diſtance, may be obtained with preciſion, by obſervations made at the ſame time with the barometer, provided that a number of theſe obſervations are collated; for this method of levelling is liable to error from ſeveral circumſtances. Storms, hurricanes, and other phœnomena of this kind, may happen in one pro-

* Volume académie 1740, Mem. de M. Caſſini.
† Volume académie 1705, Mem. de M. de Maraldi, page 219.
‡ Volume académie 1708.
§ Volume académie 1703.

vince,

vince, without producing any perceptible alteration in others, although they ſhould not be at any great diſtance.

The variations of the atmoſphere are ſo uncertain at conſiderable diſtances, that if we content ourſelves merely with comparing obſervations, made by the barometer, in places widely diſtant from each other, we ſhall be liable, in ſome inſtances, to fall into miſtakes of more than 260 toiſes; but we ſhall have nothing of this kind to fear, if, in the courſe of our journey, we frequently repeat theſe obſervations on the rivers, and on the mountains, and keep an exact journal of all other local circumſtances; eſpecially if, at the ſame time, we are ſupplied with plans of the country we are travelling through. The obſervations made on the rivers ſerve to determine their ſlope; the times when the variations of the atmoſphere have taken place are then known, and may be properly attended to.

Of the laws by which air is condenſed.

MESSIEURS Mariotte, Caſſini, Maraldi, Bouguer, and ſeveral other natural philoſophers, have ſettled the laws by which air is condenſed and rarefied. Theſe laws, although very different among themſelves, will anſwer the obſervations pretty well in ſmall heights of about 200 toiſes; but will be found not to agree in more conſiderable heights.

If the height of a mountain of 2000 toiſes is determined according to M. Mariotte's rules, this height will turn out to be about 300 toiſes too little *; and nearly as much too great according to M. Maraldi's †. The reſults from M. de Caſſini's rules are in a medium between the two preceding, and he ſuppoſes that the air is rarefied in a reciprocal ratio to the ſquare of the weight it carries.

M. Bouguer's ‡ opinion is, that the weight of the upper air diminiſhes in geometrical progreſſion, in proportion as one riſes above the level of the ſea, while the heights increaſe in arithmetical progreſſion; and the logarithmal tables, being a ſeries of numbers in arithmetical progreſſion, anſwering to other numbers in geometrical progreſſion, he ſuppoſes, that the heights of the barometer are indicated by numbers, and the heights of the air by logarithms. This rule is confirmed by all the obſervations he has made on the Cordelleiras mountains, by diminiſhing the heights one thirtieth part §; but he thinks it takes place, only in the interval, between the height of 600 and that of 2500 toiſes ‖.

* Volume académie, 1705, Mem. de M. de Caſſini, page 61.
† Volume académie, 1733. Mem. de M. de Caſſini, page 40.
‡ Figure de la terre, et Mem. académie, 1753.
§ Figure de la terre, page xxxix.
‖ Volume académie 1753, page 529.

In

In the level I took, of the road from Paris to Tobolſky, I have never had an opportunity of meaſuring any conſiderable heights, and I have found, in every inſtance, that the laws of condenſation, ſettled from experiment by M. Maraldi, have anſwered exactly to my obſervations, provided I took care to determine for each barometer I made uſe of, the quantity of air ſuſtained by a line of mercury on a level with the ſea. Thoſe who have made experiments of this kind, have almoſt always differed in the reſults, as may be ſeen by the following account.

According to M. Mariotte one line of mercury anſwers, on a level with the ſea, to - - - 10 toiſes 3 feet.

According to
- M. Maraldi to 10 - -
- M. de Caſſini to 10 - - 5
- M. de la Hire to 12 - -
- M. Picard, to 14 - - 1

This account is ſufficient to indicate, the miſtakes one may fall into, by making uſe of tables calculated from theſe obſervations. Theſe differences are attributed to collections of vapours, which may exiſt in ſome parts of the atmoſphere, and make it more heavy for a time; to the ſituation of the places where the experiments are made; and to the immediate elaſticity of the air, more or leſs powerful at different times. It is probable, that theſe phyſical cauſes contribute greatly in producing the different reſults, mentioned by divers natural philoſophers, with regard to the quantity of air one line of mercury, at a level with the ſea, can ſuſtain. I imagine, however, that theſe diſagreements have chiefly been owing to the barometers, with which the obſervations have been made. Barometers made with the ſame accuracy, of equal diameters, and filled with the ſame mercury, will agree perfectly in their height and progreſſion; but this equality will no longer ſubſiſt, if they are differently conſtructed. In order to aſcertain this by

by experiment, I made five barometers at Bitche, in 1753; the diameter of the tubes was from one line and a half to three: beſides this, they were all different, either in the manner of boiling the mercury, or with regard to the glaſs, or the mercury itſelf, which was more or leſs depurated. I found by a ſeries of obſervations, that theſe barometers hardly ever agreed either in their height or in their progreſſion; ſo that the prodigious difference there appears between Mr. Picard's reſults, and thoſe of the other philoſophers, can only be owing to the conſtruction of his barometer.

M. Duhamel, of the academy of ſciences, has one large barometer, which does not riſe more than half a line, while the others riſe a whole line; but the mercury in this barometer has not been boiled, and it is ſuſpected that this difference ariſes from ſome particles of air ſtill reſting againſt the ſides of the tube.

All theſe inconveniences are prevented, by determining, for each barometer, what quantity of air, one line of mercury, at a level with the ſea, can ſuſtain. This quantity will be different, if it is ſuppoſed, that barometers, however well conſtructed, may vary a little in their progreſſion. The miſtakes committed, will be in proportion as this difference is more or leſs conſiderable. Let us ſuppoſe, for inſtance, that the mercury riſes two lines in one barometer, while it riſes but one in M. Duhamel's; it is evident that if the level of the ſame ground is taken with theſe two barometers, the ſame object will be about twice higher by the ſecond, than by the firſt barometer, ſuppoſing, that one line of each, ſuſtains an equal quantity of air; but notwithſtanding theſe different progreſſions, the ſame reſults will be obtained, if the quantity of air, anſwering to one line of mercury, has been determined in each barometer by experiment: and for this purpoſe I have ſettled a table for each barometer I have made uſe of. This table points

out the quantity of air, ſuſtained by each line of mercury, in proportion as one is raiſed above the earth, from the level of the ſea. The method I take for this purpoſe is very ſimple, I go up with my barometer to the top of a mountain, leaving marks at all the places where the mercury ſinks one line: after I have well ſatisfied myſelf by repeated trials, that the atmoſphere has not varied, and that each mark anſwers to one line of mercury, I then determine the height of each mark by a level; and knowing already the height of one of theſe marks, with reſpect to the level of the ſea, I alſo know the quantity of air anſwering to one line upon this ſame level. It will even be ſufficient, to obſerve the barometer, at the bottom and at the top of the mountain, admitting, that the laws of the condenſation have been ſettled by M. de Caſſini, or M. de Maraldi. I have always found M. de Maraldi's agree perfectly with my obſervations; which it muſt be ſaid have only been made on places not much elevated above the level of the ſea.

I have given, in the following table, the heights of all the places on the road from Breſt to Tobolſky. The firſt column contains the names of the places; the ſecond, the height of each place with reſpect to the level of the ſea, reckoned by toiſes; the third, the height of the mercury above that ſame level. In the fourth column, the height of the mercury is determined, with reſpect to the level of the river Neva; and in the fifth, the mean heights of the barometer are indicated.

The heights of each place are given in this table with the fractions, which has not been done ſo much to ſhew with what preciſion they may be determined, as to give the real reſults of the calculations.

TABLE,

TABLE of the places on the road from Breſt to Tobolſky in Siberia, the heights of which have been determined, with reſpect to the level of the ſea at Breſt, and of the Royal Obſervatory at Paris.

Names of the places on the road.	HEIGHTS in toiſes with reſpect to the level of the ſea at Breſt.			HEIGHTS of the mercury, with reſpect to the level of the ſea at Breſt.		HEIGHTS relative of the mercury between the obſervatory and each place.			HEIGHTS mean of the barometer.		
I.	II.			III.		IV.			V.		
FRANCE.	toiſ.	ft.	in.	lin.	12ths		lines.	12ths	inch.	lin.	12ths
Breſt, level of the ſea	0	0	0	0	0	—	4	1	28	1	1
Breſt, the town	18	0	0								
Morlaix, level of the ſea	0	0	0	0	0	—	4	1	28	1	1
Pontou	32	2	0	2	11	—	1	2	27	10	2
Belliſle	41	4	0	3	9	—	0	4	27	9	4
Guingamp	32	2	8	2	11	—	1	2	27	10	2
Chatelaudrin	37	5	9	3	5	—	0	8	27	9	8
Lambale	16	2	8	1	6	—	2	7	27	11	7
Iego	1	4	11	0	2	—	3	11	28	0	11
Mountain, $\frac{1}{4}$ of a league from Dinant	55	2	0	4	11	†	0	10	27	8	2
Dinant	27	3	4	2	6	—	1	7	27	10	7
Dole	0	5	5	0	1	—	4	0	28	1	0
Avranches	37	5	0	3	5	—	0	8	27	9	8
Mountain, 1 league from Pontfarci	134	0	0	11	5	†	7	4	27	1	8
Pontfarci, river Vire	15	3	0	1	6	—	2	7	27	11	7
Villers-le-Bocage	60	0	7	5	4	†	1	3	27	7	9
Caen, river Orne	1	4	5	0	2	—	3	11	28	0	11
River, Dive	2	4	4	0	3	—	3	10	28	0	10
St. Aubin	74	5	5	6	7	†	2	0	27	6	7
Liſieux, on the mountain	30	2	5	2	9	—	1	4	27	10	4
Marché Neuf	75	1	0	6	8	†	2	7	27	6	5
Evreux, river Iton	8	4	8	0	9	—	3	4	28	0	4
Pacy, river Eure	9	0	4	0	9	—	3	1	28	0	4
Bonnieres, river Seine	10	2	8	1	0	—	3	1	28	0	0
Mantes, river Seine	12	2	7	1	2	—	2	11	28	11	11
Meulan, river Seine	13	2	4	1	3	—	2	10	27	11	10
Triel	31	2	0	2	10	—	1	3	27	10	3
Poiſſy, river Seine	14	4	7	1	4	—	2	9	27	11	9
St. Germain on the mountain	60	0	5	5	4	†	1	3	27	7	9
St. Germain, river Seine	16	5	7	1	7	—	2	6	27	11	6
Paris, Pont-royal	21	1	7	1	11	—	2	2	27	11	2
Paris, obſervatory	45	3	5	4	1	—	0	0	27	9	0

TABLE of the places on the road from Breſt to Tobolſky in Siberia, the heights of which have been determined, with reſpect to the level of the ſea at Breſt, and of the Royal Obſervatory at Paris.

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I.	II.			III.		IV.			V.		
FRANCE.	toiſ.	ft.	in.	lin.	12ths		lines.	12ths	inch.	lin.	12ths
Denainvilliers	85	5	7	7	5	†	3	4	27	5	8
Meaux, river Seine	32	5	7	2	9	—	1	4	27	10	4
Caſtle-Thierry, river Seine	44	3	0	3	8	—	0	5	27	9	5
Dormans, river Marne	48	0	0	4	0	—	0	1	27	9	1
Epernay, river Marne	51	5	0	4	2	†	0	1	27	8	11
Chalons, river Marne	56	2	3	4	7	†	0	6	27	8	6
Vitry-le-François, river Marne	62	5	7	5	2	†	1	1	27	7	11
Bar-le-duc, river Orne	70	1	0	5	9	†	1	8	27	7	4
Toul, river Moſelle	105	0	0	8	5	†	4	4	27	4	8
Caſtle Salins, river Seilles	119	0	0	9	6	†	5	5	27	3	7
Hellimer	140	0	0	11	1	†	7	0	27	2	0
Sarreguemine, river Sarre	115	0	0	9	2	†	5	1	27	3	11
Bitche, river	155	5	0	12	5	†	8	4	27	0	8
Caſtle of Bitche	202	5	0	0	0	†	0	0	0	0	0
Straſburg, river, Rhine	80	0	0	6	6	†	2	5	27	6	7
Pavement of the cathedral	86	2	0	0	0		0	0	0	0	0
Top of the ſteeple	159	4	0	0	0		0	0	0	0	0
Mountain of Donon	524	2	0	36	0	†	31	11	25	1	1
Raon, on the plain	258	2	0	19	4	†	15	3	26	5	10
Bouxveiller	129	1	0	10	3	†	8	2	27	2	10
Bromptein	88	3	0	7	2	†	3	1	27	5	11
Benfeld	95	3	0	7	8	†	3	7	27	5	5
Chatenai	112	3	0	9	0	†	4	11	27	4	1
St. Mary, at the mines	202	1	0	15	6	†	11	5	26	9	7
Mountain of St. Mary, at the croſs	447	0	0	31	2	†	27	1	25	5	11
Entrance of the mine of St. Nicholas	286	0	0	0	0		0	0	0	0	0
Depth of the mine, 101 toiſes 2 feet	0	0	0	0	0		0	0	0	0	0
Bottom of the mine, 184 toiſes 0 feet	0	0	0	0	0		0	0	0	0	0
Epfig	112	3	0	9	0	†	4	11	27	4	1
Vangenmille	95	0	0	7	8	†	3	7	27	5	5
Foot of the mount. of the caſtle of Roſe	113	4	0	9	1	†	5	0	27	4	0
Top of the mountain	211	4	0	16	2	†	8	1	26	8	11

TABLE of the places on the road from Breſt to Tobolſky in Siberia, the heights of which have been determined with reſpect to the level of the ſea at Breſt, and of the Royal Obſervatory at Paris.

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I.	II.			III.		IV.			V.		
FRANCE.	toiſ.	ft.	in.	lin.	12ths		lines.	12ths.	inch.	lin.	12ths
Vimmenau	103	4	0	8	4	†	4	3	27	4	9
Mountain Keſſelberg	219	0	0	16	8	†	12	7	26	8	5
Mountain Grebentenberg	230	0	0	17	5	†	13	4	26	7	8
Goetchebrick	190	0	0	14	8	†	10	7	26	10	5
Determined Heights.											
Gunderſhoffen, river Zinſel	92	0	0	0	0		0	0	0	0	0
Aldorf	86	0	0	0	0		0	0	0	0	0
Mulhauſen	95	0	0	0	0		0	0	0	0	0
Robach	97	0	0	0	0		0	0	0	0	0
Utweiller	100	0	0	0	0		0	0	0	0	0
Neuveiller	113	0	0	0	0		0	0	0	0	0
Meltzenheim	96	0	0	0	0		0	0	0	0	0
GERMANY.											
Ulm, Danube, river	189	4	0	14	8	†	10	7	26	10	5
Donawert, Danube, river	175	5	0	13	9	†	9	8	26	11	5
Ingolſtat, Danube, river	166	4	0	13	1	†	9	0	27	0	0
Ratiſbon, Danube, river	154	3	0	12	2	†	8	1	27	0	11
Paſſau, Danube, river	131	3	0	10	6	†	6	5	27	2	7
Lintz, Danube, river	114	5	0	9	3	†	5	2	27	3	10
Iten, Danube, river	108	0	0	8	9	†	4	8	27	4	4
Waltſe, Danube, river	107	1	0	8	8	†	4	7	27	4	5
Wiendorf, Danube, river	95	3	0	7	9	†	3	8	27	5	4
Vienna, Danube, river	80	0	0	6	6	†	2	5	27	6	7
Obſervatory of the Jeſuits	107	0	0	8	7	†	4	6	27	4	6
Wolkerſdorf	87	2	6	7	1	†	3	0	27	6	0
Gaunerſdorf	93	4	6	7	7	†	3	6	27	5	6
Nickolſburg	94	5	0	7	8	†	3	7	27	5	5
Brünn	108	0	8	8	8	†	4	7	27	4	5
Wiſchau	137	1	5	10	10	†	6	9	27	2	3

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I.		II.			III.		IV.			V.		
POLAND.		toiſ.	ft.	in.	lin.	12ths	lines.		12ths.	inch.	lin.	12ths
Malagozcz, on the river	mean	153	0	0	12	10	†	8	9	27	0	3
Inowlodz	mean	126	0	0	10	9	†	6	8	27	2	4
Warſaw, Viſtula	mean	98	0	0	8	6	†	4	5	27	4	7
Wegrow	mean	120	0	0	10	4	†	6	3	27	2	9
River Bug	mean	121	0	0	10	5	†	6	4	27	2	8
Grodno, river Niemen	mean	120	0	0	10	4	†	6	3	27	2	9
Kowno, river Niemen	mean	35	0	0	3	2	—	0	11	27	9	11
RUSSIA.												
Roop	mean	4	0	0	0	5	—	3	8	28	0	8
Stackel	mean	12	0	0	1	2	—	2	11	27	11	11
Teiglis	mean	13	0	0	1	3	—	2	10	27	11	10
Derpt	mean	18	0	0	1	8	—	2	5	27	11	5
Nenal	mean	19	0	0	1	9	—	2	4	27	11	4
Narva	mean	15	0	0	1	5	—	2	7	27	11	8
Jamburg	mean	17	0	0	1	7	—	2	6	27	11	6
Kipina	mean	20	0	0	1	10	—	2	3	27	11	3
St. Peterſburg, Neva, river		17	4	3	1	6	—	2	7	27	11	7
Tſchoudoiwa		38	2	0	3	3	—	0	10	27	9	10
Spakoi		42	3	0	3	7	—	0	6	27	9	6
Bronitſkoi-ïam, Lake		34	4	2	2	11	—	1	2	27	10	2
Zaitſowo		45	2	0	3	10	—	0	3	27	9	3
Kreſteſkoi		45	2	0	3	10	—	0	3	27	9	3
Jachelbiza		44	4	0	3	9	—	0	4	27	9	4
Zimnegorſkoi-ïam		135	0	0	10	9	†	6	8	27	2	4
Jedrowa		190	1	0	14	9	†	10	8	26	10	4
Chotillowſkoi-ïam		183	1	0	14	3	†	10	2	26	10	10
Vidropuſk		197	2	0	15	3	†	11	2	26	9	10
Torjok		189	0	0	14	8	†	10	7	26	10	5
Twer { Volga, river		178	3	1	13	11	†	9	10	26	11	2
Twer { Town		179	0	0	14	0	†	9	11	26	11	1

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Names of the places on the road.	HEIGHTS in toiſes, with reſpect to the level of the ſea at Breſt.			HEIGHTS of the mercury, with reſpect to the level of the ſea at Breſt.		HEIGHTS relative of the mercury, between the obſervatory and each place.			HEIGHTS mean of the barometer.		
I.	II.			III.		IV.			V.		
RUSSIA.	toiſ.	ft.	in.	lin.	12ths		lines.	12ths.	inch.	lin.	12ths
Gorodina	185	1	0	14	5	†	10	4	26	10	8
River Seſtra	174	1	0	13	7	†	9	6	26	11	6
Klin	178	4	0	13	11	†	9	10	26	11	2
Moſco, river Moſco	269	0	0	20	2	†	16	1	26	4	11
Koupavena	268	3	0	20	1	†	16	0	26	5	0
Bouinkova, river Kliaſma	253	3	4	19	1	†	15	0	26	6	0
Lipni	227	1	0	17	4	†	13	3	26	7	9
Undola	221	5	0	17	0	†	12	11	26	8	1
Wolodimer	230	0	0	17	7	†	13	6	26	7	6
River Kliaſma	202	2	5	15	7	†	11	6	26	9	6
Soudogda	190	1	0	14	9	†	10	8	26	10	4
Murom	158	0	0	12	5	†	8	4	27	0	8
River Occa	152	1	0	12	0	†	7	11	27	1	0
River Tioſſa	158	1	0	12	5	†	8	4	27	0	8
Monakhova	170	4	0	13	4	†	9	3	26	11	9
Pogoſt	170	1	0	13	4	†	9	3	26	11	9
Bogorodzkoe	172	0	0	13	6	†	9	5	26	11	7
Volga, river Volga	127	3	6	10	2	†	6	1	27	2	11
Niſan-Novogorod, mountain	178	0	0	13	11	†	9	10	26	11	2
Zimenki	172	4	0	13	6	†	9	5	26	11	7
Tatinets	122	2	10	9	10	†	5	9	27	3	3
River Sondevia	122	5	0	9	10	†	5	9	27	3	3
Belozericha	154	2	0	12	2	†	8	1	27	0	11
Cremianki river	127	1	0	10	2	†	6	1	27	2	11
Fokino	126	1	0	10	1	†	6	0	27	3	0
River Sura	118	2	0	9	6	†	5	5	27	3	7
Soumka	119	3	0	9	7	†	5	6	27	3	6
Kuſmodemianſk	120	3	0	9	8	†	5	7	27	3	5
Volga river	111	3	9	9	0	†	4	11	27	4	1
Eſkeren	170	0	0	13	4	†	9	3	26	11	9
Czebakſar	106	5	10	8	8	†	4	7	27	4	5
Coſki	169	10	0	13	3	†	9	2	26	11	10

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Names of the places on the road.	HEIGHTS in toiſes, with reſpect to the level of the ſea at Breſt.			HEIGHTS of the mercury, with reſpect to level of the ſea at Breſt.		HEIGHTS relative of the mercury, between the obſervatory and each place.			HEIGHTS mean of the barometer.		
I.	II.			III.		IV.			V.		
RUSSIA.	toiſ.	ft.	In.	lin.	12ths		lines.	12ths.	inch.	lin.	12ths
Ilineva	174	0	0	13	7	†	9	6	26	11	6
Caſan, Volga, river	96	4	8	7	10	†	3	9	27	5	3
Wiſocogora	108	0	0	8	9	†	4	8	27	4	4
Schurillena	117	0	0	9	5	†	5	4	27	3	8
Sumacourſa	157	0	0	12	5	†	8	4	27	0	8
Sicchi	141	0	0	11	3	†	7	2	27	1	10
Louga	150	0	0	11	10	†	7	9	27	1	3
Scynd, river Wiatka	128	0	0	10	3	†	6	2	27	2	10
Soromacou	206	5	0	15	10	†	11	9	26	9	3
Neſnimacan, river Unjak	200	5	0	15	6	†	11	5	26	9	7
Caccy	215	0	0	16	6	†	12	5	26	8	7
Derichova	189	3	0	14	8	†	10	7	26	10	5
Jouſki	177	5	0	13	10	†	9	9	26	11	3
River Zi	167	1	0	13	1	†	9	0	27	0	0
Sowialova	174	2	0	13	7	†	9	6	26	11	6
Zaſerin	149	3	0	11	10	†	7	9	27	1	3
Gavarilla, river Sciwa	145	0	0	11	6	†	7	5	27	1	7
Caſachewa	163	0	0	12	10	†	8	9	27	0	3
Bapka	156	0	0	12	4	†	4	3	27	0	9
Nevolna	159	1	0	12	6	†	8	5	27	0	7
Summit of a mountain	201	1	0	15	7	†	11	0	26	9	6
Same mountain	186	3	0	14	6	†	10	5	26	10	7
River near the mountain	166	2	0	13	1	†	9	0	27	0	0
Cracow	164	5	0	12	11	†	8	10	27	0	2
Oſſa, river Kama	152	5	0	12	1	†	8	0	27	1	0
Piſſe, river Piſſe	151	5	0	12	0	†	7	11	27	1	1
Mountain Grivenina	195	0	0	15	1	†	11	0	26	10	0
Summit of the mountain, at $\frac{1}{4}$ of a league from the river Tourka	287	1	0	21	5	†	17	4	26	3	8
River Tourka	210	3	0	16	2	†	12	1	26	8	11
Summit of the mountain, 3 leagues from Birma	250	5	0	18	11	†	14	10	26	6	2

TABLE

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Names of the places on the road.	HEIGHTS in toiſes with reſpect to the level of the ſea at Breſt.			HEIGHTS of the mercury, with reſpect to the level of the ſea at Breſt.		HEIGHTS relative of the mercury between the obſervatory and each place.			HEIGHTS mean of the barometer.		
I.	II.			III.		IV.			V.		
RUSSIA.	toiſ.	ft.	in.	lin.	12ths		lines.	12ths	inch.	lin.	12ths
Birma, river	189	0	0	14	8	+	10	7	26	10	5
River Tourka	178	3	0	13	11	+	9	10	26	11	2
Mountain, 5 leagues from Tikonoſka	211	4	0	16	3	+	12	2	26	8	10
Tikonoſka, river Irinen	168	0	0	13	2	+	9	1	26	11	11
Orda	176	1	0	13	9	+	9	8	26	11	4
Sabarca	228	2	0	17	5	+	13	4	26	7	8
Solotoukouſka	186	4	0	14	6	+	10	5	26	10	7
Baikoiva	192	2	0	14	11	+	10	10	26	10	2
Aſtchitzkaia, river	196	0	0	15	2	+	11	1	26	9	11
Biſertzkaia, river	236	4	0	18	0	+	13	11	26	7	1
Touſz, rivulet	246	5	0	18	8	+	14	7	26	6	5
Mountain	309	0	0	22	10	+	18	9	26	2	3
Klenouſkaia	219	2	0	16	9	+	12	8	26	8	4
Kirgiſchanſkaia	240	1	0	18	3	+	14	2	26	6	10
Grobova	256	3	0	19	4	+	15	3	26	5	9
Bilimbaeuſkoi, river Czauſova	252	5	11	19	1	+	15	0	26	6	0
Flat mountain	269	1	0	20	2	+	16	1	26	4	11
Foot of the mountain	235	4	0	17	11	+	13	10	26	7	2
Mountain of Chriſtal	270	2	0	20	3	+	16	2	26	4	10
Echaterinenburg, river Iſet	220	0	1	16	10	+	12	9	26	8	3
Koſulina	212	5	0	16	4	+	12	3	26	8	9
Belojarſkaia, river Pyſzma	188	4	9	14	8	+	10	7	26	10	5
Kamyſchlowſka, river Pyzma	161	3	4	12	8	+	8	7	27	0	5
Pyſchminſkaia, river Pyzma	151	5	2	12	0	+	7	11	27	1	1
Kuiarowſkaia, river Pyzma	145	0	4	11	6	+	7	5	27	1	7
Kila, river Pyzma	120	4	8	9	8	+	5	7	27	3	5
Malſchova	108	3	0	8	9	+	4	8	27	4	4
Tumen on the mountain	146	2	0	11	7	+	7	6	27	1	6
River Tura	110	3	0	8	11	+	4	10	27	4	2
Sozonowa	102	0	0	8	3	+	4	2	27	4	10
Pokrowſkaia	97	3	0	7	11	+	3	10	27	5	2
Berozoviar, river Tobolſky	89	5	4	7	4	+	3	3	27	5	9

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I.	II.			III.		IV.			V.		
RUSSIA.	toiſ.	ft.	in.	lin.	12ths		lines.	12ths.	inch.	lin.	12ths
River Irtyſz, at Tobolſky	68	4	10	5	8	†	1	7	27	7	5
Tobolſky, on the mountain	97	1	1	7	11	††	3	10	25	5	2
Solikamſky, river Kama	187	1	6	14	6	†	10	5	26	10	7
Jaiwa, river	375	5	0	27	0	†	22	11	25	10	1
River Sicchema	260	2	0	19	7	†	15	6	26	5	6
Top of the mountain	342	2	0	24	11	†	20	10	26	0	2
River, at the foot of the mountain	296	4	0	22	0	†	17	11	26	3	1
Top of the mountain	390	3	0	27	11	†	23	10	25	9	2
Moltchana	326	4	0	23	11		19	10	25	1	2
River Koſwa	346	2	0	25	2	†	21	1	25	11	11
Roſteſs	404	1	0	28	9	†	24	8	25	8	4
Beginning of the mountain	440	2	0	30	11	†	26	10	25	6	2
Top of the mountain	471	2	0	32	9	†	28	8	25	4	4
River Padira	366	2	0	26	5	†	22	4	25	10	8
Paiudinſka	313	4	0	23	1	†	19	0	26	2	0
Melechina	262	5	0	19	9	†	15	8	26	5	4
Top of the mountain, 18 werſts from Melechina	265	2	0	19	11	†	15	10	26	5	2
River Lialia	221	1	0	16	11	†	12	10	26	8	2
Lialinſkoi	192	3	0	14	11	†	10	10	26	10	2
Verchaturia, Tura, river	160	0	0	12	7	†	8	6	27	0	6
Makhneva	211	3	0	16	3	†	12	2	26	8	10
Babikhina	153	1	0	12	1	†	8	0	27	1	0
Turinſk	143	0	0	11	4	†	7	3	27	1	9
Rogeſtuenſkoie	117	5	7	9	6	†	5	5	27	3	7
Tumen, Tura, river	110	3	0	8	11	†	4	10	27	4	2

Remarks

Remarks on the height of the ſoil of Ruſſia, from St. Peterſburg to Tobolſky in Siberia.

IT was my firſt intention to have thrown theſe remarks into a note; but M. de Mairan's ingenious paper, upon the general cauſe of heat in ſummer and cold in winter, which I knew nothing of when this work was firſt committed to the preſs, has obliged me to be more explicit on this ſubject.

Ruſſia may be conſidered as one immenſe plain, extending from St. Peterſburg to Tobolſky, divided by a chain of mountains from ſouth to north, at the ſeventy-fifth degree of longitude. In different parts of this plain, ſome eminences or platforms are to be met with, as at Moſco, Caccy, and near the origin of the Kama. I have croſſed this vaſt plain from weſt to eaſt, over an extent of about 700 leagues; the diſtance from ſouth to north is 400 leagues. The Baltic ſea lies to the weſt of this plain, the river Irtyſz to the eaſt, the Frozen Ocean to the north, the ſea of Azow and the Caſpian to the ſouth.

If we caſt our eyes on the general map, it will be obſerved that the countries to the north and to the ſouth of the road I travelled through, are in general the loweſt; as moſt of the rivers have their origin in the confines of this route. Some of them empty themſelves into the ſouthern ſeas, others into the Frozen Ocean; all the eaſtern rivers into the Irtyſz, and all the weſtern into thoſe ſeas which are the boundaries of this part of Ruſſia.

Peterſburg and Tobolſky are the two extremes of this part of Ruſſia from weſt to eaſt. The firſt of theſe towns is 18 toiſes above the level of the ſea, the ſecond, 68. The extreme points of the north and of the ſouth are the level of the ſea.

According

According to the level I have taken of this part of Ruſſia, greateſt height of the country, between St. Peterſburg and Jachelbiza, an extent of near one hundred leagues, is only 45 toiſes; the ſmalleſt 18: and if the medium between theſe two reſults is taken, the mean height of this plain will be 31 toiſes, which differs only 14 toiſes from the two extremes. It has appeared to me from geography, and the informations I gained in the country, that this firſt plain extends itſelf more or leſs along ſide the ſea northward, and in ſome places ſouthward. There are generally no mountains to be ſeen on theſe ſhores, except in the ſouthern part of Ruſſia.

The diſtance from Jachelbiza to Oſſa is about 400 leagues; the whole of which extent may be conſidered as a ſecond plain.

In ſome places, however, there are hillocks, riſing grounds, or platforms, to be met with, as at Moſco, Caccy, and near the origin of the Kama. Theſe platforms are ſometimes 30 and 40 leagues in diameter. The height of the platform at Moſco is 269 toiſes above the ſea; that at Caccy, 215. The mean height, therefore, of theſe platforms is computed in even numbers at 240 toiſes*. The platform, where the Kama riſes, is at leaſt 240 toiſes †. The higheſt part of the reſt of the plain, is the level of the Kliaſma at Wolodimer, which I have deter-

* I at firſt ſuppoſed this height at 220 toiſes. This alteration has obliged me to make others; but they do not affect the inferences drawn from thence in another part of the work.

† I have not taken the level of this part of Ruſſia, but we may ſtill have a pretty exact idea of the height of this platform, by conſidering the ſlope of the Kama, which I have determined at 2 feet, 6 inches, 9 tenths *per* league. The diſtance from the origin of the Kama to Solikamſky is indeed about 130 leagues; and ſuppoſing the ſlope of the Kama at 2 feet, 6 inches, 9 tenths *per* league, the whole ſlope of the Kama, from its origin to Solikamſky, will be 55 toiſes: and the level of the Kama at Solikamſky being 187 toiſes above the level of the ſea, the height of the ſource of this river will be 242 toiſes. This height will, however, be rather more conſiderable, not only becauſe the ſlope of the river is greater towards its origin, but alſo becauſe it may reaſonably be imagined, that the higheſt point of the platform is not at the ſource of the river.

mined at 202 toiſes; and the loweſt is the level of the Volga at 96; conſequently, the mean height of this ſecond plain is 149 toiſes above the level of the ſea, or 150, to make even numbers; and therefore the platforms are 90 toiſes higher than this ſecond plain.

The chain of mountains, known by the name of the Poias or Ryphæan mountains, begins at the diſtance of a few leagues from Oſſa: it divides into two ridges towards the ſouth, ſeparated from each other by a vaſt plain. The loweſt part is Tikonoſka, the height of which has been determined at 168 toiſes; the higheſt is Sabarca, 228 toiſes. The mean of the third plain is therefore 198 toiſes. I had at firſt reckoned this plain among the number of platforms; but the diviſion of the ſoil of Ruſſia ſeemed to me more exact by admitting this third plane, which is the baſis of all the mountains.

I croſſed this ſame chain at Solikamſky, about 60 leagues more to the north. The level of the Kama at Solikamſky, and that of the Tura at Verchaturia, ſhould be conſidered as the places which point out the level of the third plane towards the north: the firſt 187 toiſes; the ſecond, 160. The mean height, therefore, of the third plane is 173 toiſes, and as I have already determined this towards the ſouth at 198; the medium between theſe two reſults, will bring out the real height of the third plane to be 185 toiſes above the ſea.

The higheſt mountain of the firſt chain is 287 toiſes. If this is compared with the height of the third plane, determined at 185 toiſes, the mean height of the firſt chain will turn out to be 235 toiſes, 50 toiſes above the third plane, and the higheſt mountain 102 toiſes above it. The higheſt mountain of the ſecond chain is that which ſtands weſtward of Klenouſkaia; its height is 309 toiſes. By comparing this to the height of the third plane, the mean height of the ſecond chain appears to be 247 toiſes, 62 toiſes above the third plane, and the higheſt mountain 124.

The

The higheſt mountain on the road to Solikamſky, is that which ſtands to the eaſt of Kiria; its height is 471 toiſes above the level of the ſea. If this is compared with the height of the third plane, determined at 185 toiſes, the mean height of the chain will be 328 toiſes above the level of the ſea, 143 above the third plane, and the higheſt point 246 toiſes above the ſame plane.

From theſe different combinations, the following reſults are produced.

Mean height of the firſt chain, above the level the ſea, - - - - - - -	236 toiſes:
Mean height of the ſecond chain, - -	247
Mean height of the chain at Solikamſky, - -	328
On an average, mean height of the chain, - -	270

I have determined the mean height of the third plane at 185 toiſes; conſequently, the mean height of the chain is 85 toiſes above the third plane, and the higheſt mountain is 286 toiſes.

From this chain to the Irtyſz, there are about 120 leagues. The higheſt ground, throughout this extent, is at the foot of the mountains: its height continues leſſening as far as the Irtyſz; ſo that this ground forms a ſlope, the higheſt point of which is at Verchaturia on the north, and at Belojarſkaia on the ſouth road. Verchaturia is 160 toiſes above the ſea, and Belojarſkaia 189. The mean height, therefore, of the higheſt part is 175 toiſes: the level of the Irtyſz at Tobolſky being the loweſt point, and the height of the level of this river being 68 toiſes; the ſlope of the ground from the chain to Tobolſky, an extent of about 120 leagues, will be 107 toiſes.

This part of Siberia forms a new plane, which is inclined, whereas the others are parallel to the horizon. This plane makes an angle of about two degrees and an half with the

horizon at Tobolſky. It riſes more and more towards the ſouth, and ſinks towards the north.

From theſe different reſults it may be concluded, that Ruſſia, from St. Peterſburg to Tobolſky, a diſtance of 700 leagues, is compoſed of four planes, each of them parallel to the horizon *, except the laſt.

The firſt plane, from St. Peterſburg to Jachelbiza, a diſtance of 100 leagues, is raiſed above the level of the ſea at Breſt 31 toiſes. There are no mountains on this firſt plane.

The ſecond plane, extending about 400 leagues from Jachelbiza to Oſſa, is raiſed 150 toiſes above the level of the ſea, and and 119 above the firſt plane. Hillocks of inconſiderable height are found upon this plane, as well as ſome platforms: theſe are 30 or 40 leagues in diameter: their mean heights are 240 toiſes above the level of the ſea, and 90 toiſes above the ſecond plane, on which they ſtand.

There is a third plane, extending about 90 leagues, from Oſſa to Echaterinenburg; the height of which is 185 toiſes above the level of the ſea, and 35 above the ſecond plane. On this third plane, the ridge of the Poias mountains is ſituated, the height of which is 270 toiſes above the level of the ſea, 85 above the third plane, and the higheſt mountain 286.

The fourth plane forms a ſlope from the chain to the Irtyſz, ſo that its angle of inclination is two degrees and a half at Tobolſky. Its height at the foot of the mountains is 175 toiſes, and at Tobolſky, which is the loweſt point of this part of Ruſſia, 68 toiſes. The ſlope, therefore, of the ground from the chain to Tobolſky, an extent of about 120 leagues, is 107 toiſes. This plane afterwards riſes towards the ſouth, and comes near the level of the ſea towards the north.

* It is ſuppoſed that each plane has particularly one uniform curvature, compoſed of ſmall planes, parallel to the viſible horizon, which extends about two leagues.

This

This diviſion agrees, in ſome reſpects, with the idea preceding travellers have had of the ſoil of Ruſſia. They have all found that it roſe on advancing towards the Poias mountains; but they have alſo ſuppoſed that it roſe equally to the eaſt of theſe mountains: and by giving a conſiderable height to theſe different planes, they have repreſented this country as the higheſt part of Europe. According to my level, theſe ſeveral planes not only appear of a moderate height, but the ground alſo, inſtead of riſing to the eaſt of the Poias mountains, ſinks on the contrary for the diſtance of near 120 leagues; and the level of the ground at Tobolſky is no more than 68 toiſes above the level of the ſea; this turns out very differently from what former travellers have advanced: nevertheleſs their authority, and that of the natural philoſophers, who have adopted this opinion, is ſo reſpectable, that I have thought myſelf obliged to pay a particular attention to this point.

Although the opinion of all theſe travellers was not founded on any obſervation publiſhed in their works; yet as their accounts agree perfectly with each other in this point, I was ſo ſtrongly prepoſſeſſed in favor of what they have advanced, that I took it for granted this part of Ruſſia was extremely high; ſo that when I found, upon calculations made from my obſervations, that the reſults were directly contrary to the received opinion; I imputed the difference to ſome miſtake in the obſervations, and endeavoured to deceive myſelf on every circumſtance which ſeemed to be in favor of them. I was indeed ſo well pleaſed with thinking myſelf miſtaken, that I would not liſten to the truth; but at length I was ſo much diſguſted with this buſineſs, which had taken up more than two months of my time, that I had once reſolved to omit this part of my journey, and to give up the barometer for ever. I took up the buſineſs again, however, ſeveral months afterwards, and confined myſelf to the obſervations alone. A firſt calculation, haſtily

haſtily made, convinced me, by the agreement of the reſults, that I was in the right. I laid aſide an opinion, contradicted by all my obſervations, and was afterwards guided only by facts.

Iſbrants Ides imagines that the mountains of Verchaturia are 5000 toiſes high; I have determined the mountain of Kyria, the higheſt in the country, at 471 toiſes above the level of the ſea; and if conſidered with reſpect to the ground on which it ſtands, it is no more than 286 toiſes high. This reſult, founded upon exact obſervations, cannot be controverted; any one may be convinced of this by examining in the laſt table of the levelling, the proceſs by which it has been determined.

M. Gmelin gives an account of ſome obſervations made by the barometer at Kyria, on the 4th of December 1742 *, and at Verchaturia at the ſame time; but he gives the obſervations only, without drawing concluſions from them. According to theſe obſervations, the barometer at Verchaturia was higher than at Kyria by 17 lines, which are equal to 269 toiſes †.

The hamlet Kyria is ſituated in a plain, which makes part of a mountain ſtanding to the eaſt of the hamlet. I have ſettled the height of this mountain at 471 toiſes above the level of the ſea. I did not take notice of the barometer in the

* Voyage en Siberia de M. Gmelin, édition Françoiſe, p. 248. t. ii. "On "going away from Verchaturia, we were inclined to meaſure, by means of the "barometer, the height of the neighbouring mountains, called the Ryphæan "mountains, in the village of Kyria, which ſtands weſtward of the mountain, "but not on its top. M. Muller obſerved, on the 4th of December, 1742, "that from eight in the morning till two in the afternoon, the height of the "barometer was 26 Paris inches $\frac{26}{100}$. The ſame day, and the ſame hours, at Verchaturia, it was at 27 inches $\frac{63}{100}$.

† Height of the barometer at Verchaturia - - 27 inches $\frac{63}{100}$

At Kyria - - - - - - - 26 26

Relative height between Verchaturia and Kyria - - 1 37

The mean height of the barometer at Verchaturia, being reckoned at 27 0 6, 1 inch $\frac{17}{100}$, or 17 lines, will be found equal to 269 toiſes.

hamlet

hamlet Kyria, but I obſerved it, on the 4th of April, at ſix in the morning, in the plain at a ſmall diſtance from Kyria, where I ſtopped a little while. According to my obſervations, the place where I took them turned out higher than Verchaturia by 280 toiſes, 2 feet *, whereas I had determined from the obſervations of M. Gmelin, that it was only higher by 269 toiſes, which makes a difference of 11 toiſes. According to my obſervations, the barometer ſhould be higher at Verchaturia by 18 lines $\frac{4}{12}$, while M. Gmelin has obſerved this relative height at 17 lines only: this trifling variation may ariſe from a difference in the barometers, from the ſpot not being exactly the ſame, and perhaps alſo from ſome difference in the temperature of the air. I have been leſs anxious, however, about making our reſults agree, than in ſhewing, from M. Gmelin's own obſervations, how inconſiderable the height of this mountain is †. It will be ſeen hereafter, from the ſame obſervations, that the earth, to the eaſt of theſe mountains, is likewiſe very low; and if M. Gmelin was really acquainted with this country, when he aſſerted ‡ "That there are large plains in "Siberia *(vaſtos ibi extare campos)* which are raiſed as much "above the reſt of the earth, and as far diſtant from the

* Height of this place above the ſea - -	440 toiſes	2
Height of Verchaturia - - -	160	0
Relative height - - - -	280	2

And if the exact heights of the barometer, with reſpect to the level of the ſea, are compared, it will be found that the barometer at Verchaturia is higher than at the ſame ſpot in the plain by 18 lines $\frac{4}{12}$.

† It may perhaps be objected, that I have not attended to the corrections which the temperature of the air requires. This is the only circumſtance in which this correction can be of any conſequence. In my obſervations made in ſummer time, the difference could only be 2 or 3 toiſes, and ſometimes 6 or 7, but here it becomes more conſiderable: but this alteration is far from adding to the height of theſe mountains, ſince, on the contrary, it makes them lower. The height of Kyria would then be 102 feet or 17 toiſes leſs, and that of Verchaturia, 7 toiſes.

‡ Paſſage quoted by M. de Mairan.

" center, as many mountains of no inconſiderable height are " in other countries *(montium non exiguæ molis)*;" the miſtake muſt have ariſen from his following the opinions of former travellers, without attending to his own obſervations.

M. de Stralemberg has alſo ſpoke very clearly upon the great height he aſcribes to this country; ſo that this traveller, to whom we are indebted for many uſeful remarks on Siberia, has given us freſh proofs of the impropriety of advancing facts not ſupported by obervations. The paſſage quoted from M. de Stralemberg, by M. de Mairan, is as follows*: " The northern " countries of Aſia, *ſays Baron Stralemberg, a Swediſh officer,* " *and a man of learning, who was a priſoner ſeveral years in Ruſ-* " *ſia and Siberia,* are conſiderably higher than the European " countries, as much ſo, *he adds,* as a table is, with reſpect " to the floor it ſtands upon: for, when we travel from the " weſt, going out of Ruſſia, and paſs on to the eaſt, by the " Ryphæan mountains, to get into Siberia, we find that " we always riſe, rather than deſcend, as we advance." From this authority, joined to M. de Gmelin's, M. de Mairan concludes with reaſon, that if we muſt riſe, rather than deſcend, on going from the Ryphæan mountains, to the eaſt of that chain of mountains which ſeparates Europe from Aſia, it follows, that how little ſoever theſe mountains are raiſed, the vaſt plains of Siberia muſt of neceſſity be upon a level with the tops of pretty high mountains.

My obſervations are directly contrary to theſe facts and this aſſertion; ſince it appears from theſe, that, on travelling eaſtward from the Ryphæan mountains, the ground rather falls than riſes from this chain of the Irtyſz, throughout an extent of about one hundred and twenty leagues; of which one may be convinced without the teſtimony of my obſervations. We

* Mémoire de l'Académie Royale des Sciences de 1765. This paſſage is taken from the deſcription of Ruſſia, French tranſlation, tom. i. p. 332.

need

need only caſt an eye upon any map whatſoever of theſe countries, and we ſhall find a number of rivers, whoſe ſource is in the Ryphæan mountains, and their courſe eaſtward from thence, emptying themſelves into the Irtyſz, at the diſtance of one hundred and twenty leagues from the chain: from whence it is evident, that the ſoil muſt be on a continual deſcent from the Ryphæan mountains to the eaſt. I have determined the ſlope of theſe rivers by the moſt accurate obſervations; and have found, that the ſlope from the moutains to Tobolſky is 107 toiſes; the height of the Irtyſz at Tobolſky 68 toiſes above the level of the ſea, and 47 toiſes above the level of the Seine at Paris.

M. de Mairan mentions alſo another paſſage in the ſame part of his *Memoire*, pag. 256. It is aſſerted as a fact, in Cellarius's geography, quoted by this learned academician, that the Ryphæan mountains are conſtantly covered with ſnow. Although this would be no proof that the mountains in theſe northern countries were very high, yet I ſhall take upon me poſitively to deny the fact. I croſſed theſe mountains at Echaterinenburg in the month of Auguſt, and they were not then covered with ſnow: at the end of May, the ſnow diſappears from the mountains of Solikamſky, although they are higher, and their ſituation is more to the north than thoſe of Echaterinenburg; and if there was any foundation for the fact mentioned by Cellarius, it would not certainly have been unnoticed by Meſſ. Gmelin, Stralemberg, Muller, and ſeveral other travellers, who have paſſed through this country.

Although it is evident, from what has been already ſaid, that this country is not ſo high as it has been thought to be, yet it may not be improper to eſtabliſh the validity of this opinion by ſome farther proofs, which would be ſufficient of themſelves to determine the point.

All philoſophers know, that the variations of the barometer become leſs in proportion as we riſe in the atmoſphere; ſo that, in conſiderable heights, the mere obſervations of the barometer, compared to the mean height of this inſtrument at the level of the ſea, are ſufficient to determine the degree of elevation. If we ſuppoſe this country to be raiſed one half league only above the level of the ſea, inſtead of two leagues and a half which M. Iſbrants Ides gives to theſe mountains, then, the barometer will be ſix inches lower upon theſe mountains than at the level of the ſea; and the mean height of the barometer in theſe places would only be 22 inches, for the mercury would never riſe to 23. Now, I have obſerved, in the place acknowledged by all travellers to be the higheſt of the chain, that the barometer was at the height of 25 inches, 11 lines, $\frac{8}{12}$, upon the top of the mountain of Kyria, on the 4th April, at eight in the morning; and M. Gmelin, in a place a little below this, obſerved it at 26 inches, 5 lines; the barometer in theſe places being about 4 inches above the mean height of 22 inches. It is therefore evident from theſe obſervations, that theſe mountains cannot be more than about 400 toiſes high, inſtead of 2500, as M. Iſbrants Ides aſſerts.

If all my obſervations made in Ruſſia are examined in the ſame manner, it will ſtill be found, that this country is lower than it has been ſuppoſed to be, ſince the barometer was in all places very high. During my ſtay at Tobolſky, from the 23d of April to the 28th of Auguſt, I obſerved the barometer at 28 inches, 10 lines, $\frac{4}{12}$, on the 28th of April, nearly as at Paris; and the loweſt point was 27 inches, 6 lines, on the 24th of June. Theſe facts are ſo clear, that they will not even admit the ſuppoſition of the country being higher than I have computed it. It is therefore certain, that all travellers have been miſtaken in giving ſuch an exceſſive height to the Ryphæan mountains and to this country; it is equally certain, that the

ground falls, instead of rising, from the Ryphæan mountains towards the east; and that the country lying eastward of these mountains, far from being on a level with the tops of any pretty high mountains, is, on the contrary, lower than most plains of a moderate height in Europe; since the Irtysz at Tobolsky, one hundred and twenty leagues distant from the mountains, is no more than 68 toises above the level of the sea.

My only intention, in these remarks, has been to make it appear, that the part of Russia I went over is lower than it has been imagined; and I have not had the least design of controverting M. de Mairan's ingenious system on the causes of cold in winter and of heat in summer. In speaking hereafter of the climate, I shall prove, that the part of Siberia, to the east of Tobolsky, is not of so great a height, as that the almost incredible cold which prevails there, can be ascribed to this circumstance: this is owing to some particular and local causes, and those which I have assigned are equally applicable to M. de Mairan's system.

MINERALOGICAL OBSERVATIONS.

THE ſandy tract of Poland extends all over Ruſſia, as far the mountains which ſeparate Siberia from the reſt of this empire. I could not make myſelf acquainted with the nature of this ſoil, till my return from Tobolſky to St. Peterſburg; for as I had ſet out from this capital in winter-time, the ground was covered with ſnow. I ſhall hereafter ſpeak of the ſuperficial ſoil of this country, and ſhall at preſent confine myſelf to the examination of that part of the chain of the Ryphæan mountains, lying between Solikamſky and Echaterinenburg. I have examined this part with the greateſt care; having alſo had an opportunity of examining the internal parts of the earth, by going down into the mines which are worked there.

Before I enter upon my account of the mines, I ſhall juſt ſpeak of the gypſes which are found in Ruſſia, in the neighbourhood of Cazan, and in Siberia. I have already mentioned them in the detail of my journey, where I referred to ſome farther particulars on this ſubject, which I introduce here, to preſerve the order of the route.

Of the Gypſes.

I. *Solid, ſtriated, half tranſparent Gypſe.*

This is found on the Occa, four leagues weſtward of Niſan-Novogorod. It forms a bed of two inches thick, in the mountain ſituated to the ſouth of this river. This gypſe lies between two beds of red clay, of a moderate firmneſs. The layer

layer of gypſe is 6 toiſes above the level of the river, and conſequently 131 above that of the ſea*.

This gypſe is white, made up of long and ſparkling fibres: it is compact, it divides itſelf into lamellæ; and is harſh to the touch. Theſe lamellæ are not eaſily rubbed to powder between the fingers: they appear at firſt like ſo many ſmall fibres, reducible into a pretty fine powder, but hard to the touch. It does not efferveſce with acids, and when calcined puts on the whiteneſs of ceruſs. The parallel fibres, of which it is compoſed, ſeparate upon the ſlighteſt preſſure; it then ſticks to the finger, is ſoft to the touch, and falls into a ſaponaceous powder, like that of the Chineſe gypſe, to which it has ſome reſemblance; but does not decrepitate in the fire as that does; beſides, its fibres, even before calcination, are coarſer, leſs compact, and have not the ſilkineſs of the Chineſe gypſe.

This gypſe conſiſts of three beds. The fibres of the two lower beds, run in the ſame plane, perpendicular to the baſe, but the upper bed is compoſed of oblique fibres.

II. *Cryſtalliſed, tranſparent Gypſe, reſembling a pen.*

This gypſe is not unlike a pen. The lamellæ, or cryſtals, of which it is made up, terminate all upon one line as the feathers upon a quill. The planes of the large lamellæ make angles of about 50 degrees, and the ſmall ones of 70 degrees, with this line.

This gypſe divides itſelf into layers in the direction of planes, perpendicular to thoſe of the large lamellæ: its ſurface is as ſmooth and ſhining as well poliſhed glaſs. Theſe layers are not pliable in the leaſt, and therefore break very eaſily. They

* Niſan-Novogorod is 127 toiſes, three feet, above the level of the ſea. This height, and the ſlope of the Occa, being given at 4 feet, 6 inches, $\frac{6}{10}$, we find the height of this bed to be 130 toiſes, 4 feet.

may

may be ſubdivided into others ſo thin, as not to produce any great alteration in the color of paper. The parts which compoſe this gypſe are ſo ſmall and ſo ſmooth, that it is impoſſible to diſtinguiſh them through a magnifying glaſs. The ſmall lamellæ are formed into a kind of parallelepiped. If we ſtrike theſe ſolids in a direction perpendicular to their baſe, they all ſeparate into parallelepipeds, compoſed of lamellæ ſimilar to thoſe we have juſt before been mentioning.

This gypſe does not effervеſce with aqua fortis. It decrepitates in the fire, loſes its tranſparency, and divides itſelf into lamellæ, which are perfectly ſmooth, and of a grey pearl color. It has a ſilken feel, when powdered between the fingers, and is ſoft to the touch as the former, but leſs friable. It is found on the Volga, at ſome leagues ſouthward of Cazan.

III. *Tranſparent gypſe, cryſtalliſed in form of a parallelepiped.*

This gypſe forms a kind of oblique parallelepiped. It is compoſed of two parallelograms and eight trapeziums. The lower baſe, as well as the upper, is a parallelogram whoſe correſpondent angles are equal, and the remaining angles of which are obtuſe and acute; the obtuſe angles are of 129 degrees, the acute of 51. The lower baſe is ſomewhat larger in all directions than the upper. Each ſurface is compoſed of two oblique trapeziums, all the ſides of which are unequal, even thoſe of the correſpondent trapeziums. Theſe ſurfaces are inclined, and form obtuſe angles at the points of contact. Theſe angles are equal on the correſpondent ſurfaces, of 160 degrees on the large ſides, and 110 on the ſmall ſides. If ſections were made parallel to the baſe of this parallelepiped, and paſſing through the line of contact of theſe trapeziums, we ſhould then have four ſections, about one tenth of an inch diſtant

diſtant from each other, becauſe the ſides of theſe trapeziums are all unequal.

This gypſe, although it is an inch thick, is tranſparent enough, to let one diſtinguiſh a black line, when it is laid on paper. Its color is rather browniſh. When cut with a knife, parallel to its baſe, it divides itſelf into lamina as thin as the Ruſſian glaſs, or *glacies mariæ*, but different from the latter inaſmuch as they have no kind of elaſticity, and are as brittle as glaſs. The ſurfaces of theſe lamina are as ſmooth as the beſt poliſhed glaſs. They even reſemble ice of a browniſh hue.

This gypſe decrepitates in the fire, loſes its tranſparency, becomes very light, and of a fine ſilken white color: its ſurface remains ſmooth; it does not efferveſce with aquafortis; its lamina are diſtinguiſhable, but are not ſo thick. It is ſo friable when calcined, that it falls into ſmall leaves on the ſlighteſt touch. It may be rubbed down between the fingers to a very fine ſoft powder. This gypſe is found on the Volga, to the ſouth of Cazan.

IV. *Tranſparent gypſe, cryſtalliſed in form of oblique parallelepipeds.*

This gypſe is compoſed of ſeveral parallelepipeds reſembling the laſt, but they are not ſo regular, although they are moſt of them furniſhed with the ſame number of ſides. They differ almoſt all in ſize, and form various groups, which make this figure altogether very irregular, although, in general, it has ſome reſemblance to an inclined parallelepiped, compoſed of ſix parallelograms. To each of theſe parallelepipeds in particular, may be applied what has been ſaid of the laſt. The principal difference is in the color, which in theſe is rather yellowiſh than brown. This gypſe is found on the Volga, ſouthward of Cazan.

V. *Gypſe*

V. *Gypſe tranſparent in the ſtrata.*

This gypſe comes from the Poias mountains, between Echaterinenburg and Solikamſky, but I know not from what particular ſpot. It is diſpoſed in layers. The piece I have, forms a plate three inches long, two inches wide, and four lines thick. It is as diaphanous as glaſs, and is of the color of white glaſs. The ſame peculiarities may be obſerved in it as that of N°. III, with this difference, that native ſulphur is ſometimes found in it.

VI. *Mica, Muſcovy glaſs.*

This kind of gypſe is found in ſeveral parts of Ruſſia, eſpecially in Siberia, where glaſs is made of it. It is ſometimes two feet and a half ſquare, and commonly five or ſix inches. It is one third of a line in thickneſs, and is ſo tranſparent that one may read through it: its color is a light brown, inclining to yellow.

It makes a certain noiſe when ſcraped with the point of a knife, or any other inſtrument; it is ſo tough, that it muſt be bent backwards and forwards ſeveral times before it will break, and is compoſed of an infinite number of lamina. At firſt it ſeparates readily into ſix or ſeven lamina in its longitudinal direction; each of which become flexible and more tranſparent. The ſurfaces are very ſhining, and as ſmooth as the beſt poliſhed glaſs. Each of theſe lamina is eaſily ſubdivided into three others: they are then ſo tranſparent, that the color of objects is not much affected by them; they are alſo ſo pliable that they may be twiſted round the finger like paper, and will immediately recover their common form. If one of theſe lamina is farther ſubdivided, it falls into ſpangles, which may be blown away.

This mica reſiſts fire and acids: it does not decrepitate, but makes a noiſe ſomething like butter beginning to melt in a pan, which ſeems to proceed from the ſeparation of the lamina: it then becomes four lines in thickneſs, inſtead of one third of a line as it was before. A number of about thirty lamina more or leſs diſtant from each other may be diſtinguiſhed in it; and although they ſhould be brought together with the fingers, they immediately return to their natural ſtate.

This mica, after being made red hot, is ſtill pliable: it acquires a white color as bright as ſilver. It loſes its tranſparency when left to its original thickneſs of one third of a line, and becomes half tranſparent again when divided into twenty lamina. It may then be ſubdivided into an infinite number of other lamina of different ſizes, like the ſilver leaves uſed by the gilders. When it is rubbed for any time in the palm of the hand, it falls into ſpangles which ſtick to the ſkin.

Of the different mines in Siberia, between Solikamſky and Echaterinenburg.

Ice and ſnow cover the country on which I have made the following obſervations for moſt part of the year. It is commonly ſpoken of by the Ruſſians, as of a new Peru, in which mines of gold and ſilver, and precious ſtones abound. Although much may be taken off from this account, it is ſtill certain, that mines of gold and ſilver are to be found within the frozen ſoil of Siberia, as within the parched territories of the torrid zone; but theſe mines, at leaſt thoſe of the Poias mountains, are never to be found among thoſe immenſe rocks, which form ridges of mountains, extending over an infinite ſpace, and croſſing the globe. The mines in Siberia are rather found in plains ſituated on the tops of low mountains: they are one

or two feet below the ſurface: their extent and diſpoſition is ſuch as to furniſh the naturaliſt with an unuſual appearance: The copper and iron mines equally deſerve our attention. Thoſe of iron are every where diſtributed in heaps, and do not keep any invariable order in their ſituation. That I may proceed with regularity, I ſhall treat particularly of each ore.

To fulfil this undertaking, I brought away a large collection of all the ores of this country, with remarks ſerving to illuſtrate the hiſtory of them. Theſe remarks I made on the ſpot, and collected the materials from the pits, which had been made to raiſe the ore. Whenever it was not poſſible for me to go to the ſpot, I conſulted the perſons in the country who had the direction of the mines. At my return into France, I was aſſiſted by M. le Sage, well known for his progreſs in chymiſtry; and M. Bouchu, correſpondent of the Academy of Sciences, was alſo kind enough to take upon himſelf all the experiments made on the iron ores.

I. *Loadſtone.*

This iron ore is in general not eaſily melted; it produces a very bad iron, and that in ſmall quantity. The loadſtone of Siberia is on the contrary a very rich ore. It is found in different parts of the Poias mountains, between Echaterinenburg and Solikamſky. That which I am moſt acquainted with, is from the mountain Galazinſki, ſituated about ten leagues out of the road in going by Echaterinenburg, and ſixteen leagues weſtward of the forge of Bilimbaeuſkoi *. In

* This forge belongs to Count Strogonow. The ore is melted and the iron prepared here, as in almoſt all the forges I ſhall have occaſion to ſpeak of. By a forge we are therefore to underſtand the place where the furnaces are, and where the metal is put into fuſion.

this

this place, I found heaps of this ore above twenty feet high: I judged it at firſt ſight to be loadſtone; and indeed it is called magnetic ore: but when torrefied, it loſes its attractive property. I readily got ſome that had not been expoſed to fire, and knew it immediately to be loadſtone. I brought away more than twenty pounds of each; but before I give any particular account of this ore, I ſhall juſt mention what the director of the forge told me about it.

The mountain from whence it is taken is more than 20 toiſes high: the ore is found at the bottom in beds ſeparated by the earth; but the ſummit of the mountain is formed only by rocks of loadſtone.

The crude loadſtone of the mountain of Galazinſky is hard and compact; it ſtrikes fire againſt a ſteel; it is of an iron colored brown; and courſe ſhining lamellæ are to be obſerved in it when broken. Having torrefied ſome pieces of this loadſtone, it loſt its power of attracting the filings of iron; but if applied to ſome filings thrown upon a loadſtone not torrefied, the filings were attracted by the calcined loadſtone, although not ſo powerfully as before calcination. This loadſtone, calcined and pounded, falls into a powder, reſembling the filings of iron, and equally ſubject to the powers of the common loadſtone.

The torrefied loadſtone I brought with me from Bilimbaeuſkoi, is exactly the ſame, in every particular, as the crude loadſtone which I calcined at Paris.

The crude loadſtone loſes two pounds on each hundred by calcination.

Produce *per* hundred { not torrefied, - - 58
torrefied, - - 60

The regulus of the firſt fuſion does not run kindly, is irregular, and colored.

The regulus of the ſecond fuſion takes the mould well, is ſharp, and colored with blue and red; and the ſlags are red.

The torrefied loadſtone at Bilimbaeuſkoi produces forty-three *per* hundred. The regulus is well fuſed, but irregularly ſhaped: it is deeply colored with blue and yellow; and the ſlags are reddiſh *.

II. *Loadſtone.*

In the neighbourhood of the forge Utinſkoi, on the borders of the river Czauſowa.

This loadſtone is of the ſame kind as that of the mountain of Galazinski, but leſs perfect, being mixed with a quantity of ferruginous, and ſometimes copper earth.

III. *Loadſtone.*

In the neighbourhood of Viſimkoi, of the ſame nature as that of No I. but more compact and ſmoother, and poſſeſſed of ſtronger attractive powers.

IV. *Loadſtone.*

This is found to the ſouth-eaſt of Solikamsky: it is of the ſame nature as No I. of middling magnetic power, and containing many earthy particles.

* This ore being the ſame as that of No I. the produce ſhould be ſimilar: however M. le Bouchu's experiments cannot be doubtful, becauſe they are made twice upon the crude ore; but as I brought ſeveral loadſtone ores with me, it is probable that I may have been miſtaken in the number I gave to him. Many chymiſts are of opinion, that a regulus of iron cannot be obtained by experiments made on ſmall quantities. M. le Bouchu has invalidated this opinion; and it will be ſeen by what follows, that the reſult of theſe experiments ſcarcely differs from ſome of thoſe I made on the ſpot, in the working of theſe mines at large.

V. *Loadſtone.*

In the neighbourhood of the forge of Serebrianſkoi. It is of the ſame nature as the others, and extremely hard. It ſtrikes fire with ſteel. Its iron color is not ſo bright, and the ſhining ſpangles are leſs: it ſeems very rich in iron.

VI. *Loadſtone.*

From the mountain of Galazinſki, already ſpoken of N$_o$ II. it has been calcined at Bilimbaeuſkoi, and produced after this new trial 47 *per* hundred: in the country the produce is reckoned at 50 *per* hundred.

Loadſtone is found alſo in other parts of this chain, where it is very common. It ſeems all of the ſame kind. The variety of appearances to be obſerved in it, depend on the greater or leſs quantity of earthy particles with which it may happen to be combined. The product mentioned at N^o I. and II. ſeems to indicate the two extremes of the richneſs of the ore, one of which conſequently brings 60 *per* 100, the other 43.

The loadſtone is found only in that chain, whoſe direction is from ſouth to north.

VII. *Cubic and greeniſh Loadſtone.*

This is found in the mountains ſituated to the ſouth of Solikamſky, at the diſtance of twenty leagues from this town. This ſtone is very hard, compoſed of ſmall cubes, grouped together in all kinds of forms, in a greeniſh ſubſtance. The cubes are of a bright luſtre, of the color of iron: iron filings adhere equally to the cubes or to the greeniſh ſubſtance. The ore,

when

when reduced to powder, exhibits ſome ſhining ſpangles of an iron colour, and a greeniſh duſt. The loadſtone attracts theſe two ſubſtances equally. This ore calcined becomes of a black color, inclining to blue. The green diſappears, it attracts no more the iron duſt, unleſs that is previouſly thrown upon another loadſtone reduced to powder; it falls into ſmall cubes of a brown iron color. The greeniſh particles are no more to be ſeen in it: the iron ſeems mineraliſed in this ore by arſenic. It loſes by calcination 7 *per* 100, and produces a regulus ill ſhaped, of ſeveral colors, and brings 55 and a half *per* 100.

VIII. *Iron Ore in Strata.*

Iron ore of Bilimbaeuſkoi, five leagues to the ſouth-weſt. This ore is compact, of a yellow color, inclining to red. The martial earth is mixed with a little clay; it is diſpoſed in ſtrata. In ſome places, black metallic particles may be obſerved, more compact than the reſt of the ore.

This ore, when crude, is not attracted by the loadſtone, but becomes ſo in a ſmall degree when calcined, by which operation it loſes 8 *per* 100.

Produce *per* 100 { when crude, after two fuſions, - 28
calcined, - - - - - - 32

In the firſt experiment on the crude ore, the fuſion was imperfect, and the produce was put into the crucible again. The ore calcined was colored, as in the firſt trial.

IX. *Solid, blackiſh Iron Ore.*

This is found to the ſouth of Bilimbaeuſkoi, in the ſmall mountain of Galazinſki, from whence I took it. It is diſpoſed in rocky maſſes, from two to ſix feet in diameter. It is found in a ferruginous earth, the produce of which is almoſt as rich

rich as that of the rocky ore itſelf. When the ore is broken, cavities are ſometimes found in it, the inſide of which is lined with a ferruginous earth of the deepeſt black color. By the help of a magnifier, ſmall round tubercles may be diſtinguiſhed in it. The inſide of theſe cavities ſometimes appears as if it was lined with the moſt beautiful black velvet. In other places, the cavities are very large and extremely irregular. The inſide of the ore is vitrified, it is ſhining and browner than the reſt. This vitrification has probably been brought about by a volcano. The reſt of the ore, which forms the rock, is very compact, of a brown color, inclining to red in the broken parts; and covered outwardly with a yellowiſh oker.

The loadſtone does not act upon this ore in its crude ſtate, but attracts it powerfully when calcined; it loſes by this operation 13 *per* 100.

Produce *per* 100	when crude, - - -	51 $\frac{1}{2}$
	calcined, - - -	53

At Bilimbaeuſkoi, the produce is reckoned at 50 *per* 100.

The regulus in theſe two experiments is well-ſhaped: yellow and red colors are to be obſerved in it, and ſome tough ſlags.

Iron ore is to be found in other parts of this mountain, with cavities, as in the foregoing; the inſide of which, does not exhibit the ſame appearances. This ore is decompounded, and may be ſaid to conſiſt chiefly of pure ferruginous earth. There are ſtill ſome ſolid parts in its inſide, which ſeem to indicate that it is the ſame ore as the foregoing: the produce, however, is very different. It is not ſubject to the powers of the loadſtone when crude, but becomes ſo, to a great degree, when calcined; by which it loſes 10 *per* 100.

Produce *per* 100	when crude, - - -	34
	calcined, - - -	52

In the firſt fuſion, this ore is colored with yellow, blue and red, and produces an ill-ſhaped regulus.

In the ſecond fuſion, it produces green ſlags, and a regulus well-ſhaped, ſharp, and colored with blue and yellow.

X. *Solid Iron Ore, of a brown color, inclining to red.*

This is found about ſeven leagues to the ſouth-weſt of Echaterinenburg. It is compact. Its outward ſurface is covered with a yellow oker, of a reddiſh brown in the breakings of its ſolid parts. In the other parts it is friable. Theſe ſhew a decompounded ore, and ſome blackiſh parts, which are ſtill ſolid.

This ore, when crude, is not acted upon by the loadſtone; but is ſlightly attracted by it, after calcination; by which it loſes 14 *per* 100.

Produce *per* 100 { when crude, - - - 48
calcined, - - - 48 $\frac{1}{2}$

In the country, the produce is reckoned at 45 *per* 100.

The fuſion was imperfect in the firſt experiment on the crude ore; it was therefore put into the crucible again, and a regulus was obtained, well-ſhaped, ſharp and colorleſs.

The calcined ore produced a regulus well-ſhaped, ſharp, and colorleſs.

XI. *Spongy Iron Ore.*

This is taken from the neighbourhood of Bilimbaeuſkoi, near the mountain of Galizinſki. It is internally full of ſmall cells like thoſe of a ſponge; with this difference, that they are ſometimes formed by thin plates. This ore is partly decompounded: it is black in ſome places, and brown in others: ſome of the plates are ſhining, and as if they were vitrified.

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In general, it ſhews nothing but an oker of a deep yellow. Sometimes, however, ſolid particles may be ſeen in it, which reſemble exactly the ore N° VII. Their color is a reddiſh brown.

This ore, when crude, is not acted upon by the loadſtone, but becomes ſubject to its powers after calcination; by which it loſes 10 *per* hundred.

Produce *per* 100 { when crude, - - 40 / calcined, - - - 47

In the country the produce is ſometimes reckoned at 50 *per* 100.

The crude ore produces a regulus well ſhaped, ſharp, and colored in ſeveral places with blue, red and lively yellow.

XII. *Black ſpongy iron ore.*

This is found to the ſouth of Bilimbaeuſkoi, at a ſmall diſtance from that of N° X, to which it bears ſome reſemblance; but it ſtill very different in ſeveral particulars. It is full of cavities, as the pumice ſtone, and is nearly as light, whereas the other ore is rather heavy. The inſide of this laſt ore is homogeneous, and of a very dark black color. It is covered externally with an oker of a bright yellow, which indicates a ſtate of decompoſition. When crude it is not attracted by the loadſtone, but becomes ſubject to it after calcination; by which it loſes 13 and a half *per* 100.

Produce *per* 100 { when crude, - - 28 / calcined, - - 32

In the country the produce is reckoned at 35 *per* 100.

The crude ore produces a regulus well ſhaped, ſharp, and colored with deep blue and red.

The ore calcined produces a regulus well ſhaped, ſharp, and colored in ſome places.

XIII. *Solid iron ore.*

I could only get this ore in its calcined ſtate: it is ſituated to the north of Bilimbaeuſkoi, but I am not acquainted with its exact ſituation. Although calcined, it is very ſolid, compact, and heavy. It is black in ſome places, and of a deep red in others. It did not appear to be affected by the loadſtone.

This ore produces green ſlags, a regulus well ſhaped, ſharp, of a blue color, and 54 *per* 100. In the country it is reckoned to produce 45 *per* 100.

XIV. *Solid blackiſh iron ore.*

This is found in the neighbourhood of Wolofzkoie, one league and a half diſtant from Bilimbaeuſkoi ſouthward. It is hard and very compact. At its broken parts ſhining points are to be obſerved: its color is brown inclining to black. Its ſurface is irregular and rugged, without cavities. Some ſmall ſtones are to be obſerved in it. This ore partakes a little of the hœmatites: it is covered with a ferruginous earth of a bright yellow.

This ore is not ſubject to the loadſtone, except when calcined; it is then friable, of a blueiſh color on the inſide, and reddiſh without. It loſes 12 *per* 100.

Produce *per* 100 { when crude, - - 55
calcined, - - 61

In the country the uſual produce is reckoned at 50 *per* 100.

This ore, in its crude ſtate, produces a regulus well ſhaped, ſharp, colored with red and blue: when calcined, the regulus is alſo well ſhaped, ſharp, and ſome few colors are ſtill to be ſeen in it.

In the ſame place is found another iron ore, bearing a great reſemblance to the firſt. It is ſolid, compact, and brown on the

the inſide: ſeveral ſhining points are to be obſerved in it, which appear to be chryſtalline. It is not ſmooth on the broken ſurface as the firſt, except in ſome places, which are of a blackiſh brown, and ſeem to have ſome analogy to the hœmatites. This ore is covered externally with a ferruginous earth of a bright yellow: it is not attracted by the loadſtone till after calcination; when it ſtill remains very hard, and loſes 5 and a half *per* 100.

Produce *per* 100 { when crude, - - 46½
calcined - - 50

This ore produces, both when crude and calcined, a regulus well ſhaped, ſharp, and colored.

In the neighbourhood of the ſame place another ore is likewiſe found, which I only got in its calcined ſtate: it is then very hard, compact and heavy: it is blueiſh on the inſide, and outwardly reddiſh. It is not much affected by the loadſtone. It produces yellow ſlags, a regulus well ſhaped, yellow, and 16 *per* 100.

XV. *Reddiſh iron ore in ſtrata.*

This is taken from the neighbourhood of Schaitanſkoi, to the eaſt of Bilimbaeuſkoi: it is very hard, compact and heavy, of a brown inclining to red, or rather of the color of wine lees. On its inſide are alſo to be obſerved ſome ſhades of a bright yellow; and it is covered on the outſide with a yellow ferruginous earth. In ſome parts one may diſcover little ſhining tubercles of a very deep black, which bear a great reſemblance to the hœmatites. On its broken ſurface longitudinal ſtreaks are to be ſeen; but theſe ſeem to be formed from the ſtrata of which it is compoſed, and which are variouſly colored.

The loadſtone does not attract this ore when crude; and but inconſiderably when calcined: it is then friable, the ſtrata become more evident, and are diſpoſed in thin plates. Its inſide is colored with different ſhades of red, ſometimes very dark. It loſes by calcination 15 and a half *per* 100.

Produce *per* 100 { when crude, - - 35
calcined, - - 51

The crude ore produces green ſlags, a regulus well ſhaped, colored with yellow and red; when calcined, it produces green ſlags, a regulus well fuſed, but irregularly ſhaped and colored.

XVI. *Blackiſh iron ore.*

This is found ſouthward of the forge of Schuralinſkoi, near the origin of the river of Rez. It is very hard and compact, and breaks into ſmall ſhivers: it is full of cavities, in which is obſerved ſome oker of a light yellow, and ſometimes brown. The ſolid parts of the inſide of this ore are of a brown black color, its outward ſurface is rugged.

The crude ore is not ſubject to the loadſtone, but when calcined is ſlightly affected by it: it then becomes of a very dark red, and loſes 13 *per* 100.

Produce *per* 100 { when crude, - - 51½
calcined, - - 58½

The crude ore produces a ſpongy regulus of a yellow color; when calcined, the regulus is well ſhaped, ſharp, and colorleſs.

XVII. *Brown iron ore.*

This is taken from the neighbourhood of Caravievi, twenty leagues to the ſouth of Echaterinenburg; it is hard and compact. Various ſubſtances are to be obſerved on its inſide. The ore, in general, is of a dark brown color, and in ſome

places black. Some ſhining points are diſcernable in it, which appear to be the ore chryſtallized: in the brown parts ſome mica may be diſtinguiſhed, and other ſmall ſhining points which ſeem to be chryſtal. In ſome places talc is found of a white color inclining to yellow: it is diſpoſed in thin plates. It ſeparates readily, and is as eaſily rubbed to powder between the fingers. Its external ſurface is irregular, of a brown color intermixed with yellow ſhades, ariſing from a ferruginous earth.

The loadſtone does not attract this ore when crude, but acts powerfully upon it after calcination, when it remains ſtill very hard. It is colored with blue and ſeveral ſhades of red: it loſes by calcination 13 *per* 100.

The crude ore produces a regulus well ſhaped, not colored, and 39 *per* 100. The calcined ore is reckoned in the country to produce 40 *per* 100.

XVIII. *Iron ore in ſtrata.*

This is found in the neighbourhood of Echaterinenburg: it is diſpoſed in ſtrata one third of a line thick. Theſe ſtrata are of a black color inclining to blue; they are divided by yellow oker, which forms one ſtratum of very little thickneſs. This ore is ſometimes of a dark brown color, and of a brown inclining to yellow: it breaks into ſhivers. Its external ſurface is rugged, and covered with yellow oker. In ſome parts a blackiſh ſpongy ſurface may be diſtinguiſhed, which exhibits myriads of pores through a magnifying glaſs.

The crude ore is not affected by the loadſtone; but is ſlightly acted upon by it after calcination: it is then puffed up, very friable, and of a very dark red color. It loſes 11 *per* 100 by calcination.

Produce

Produce *per* 100 { when crude, - - 36½
calcined, - - 41½

XIX. *Solid iron ore.*

This comes from the neighbourhood of Echaterinenburg; I only got it in its calcined ſtate; it is then friable. Its inſide is in general of a dark red, and in ſeveral places of a ſhining black color. In ſome places points of a bright red may be obſerved. This color diſappears by the application of aqua-fortis, and returns again inſtantaneouſly. The external ſurface of this ore is reddiſh; it is ſlightly affected by the load-ſtone, and bears ſome reſemblance to the hæmatites.

It produces 42 *per* 100, red ſlags, the ſurface of which is covered with a kind of white enamel, and a regulus well ſhaped, ſharp, and of a bright yellow color.

XX. *Brown iron ore.*

This is to be found in the neighbourhood of Echaterinenburg; it is very compact. Its outſide is generally of a dark brown color. There are ſome cavities in it, the inſide of which is lined with a very black ferruginous earth, with tubercles in ſome places. Some ſhades of a deep yellow oker are alſo to be diſtinguiſhed in it; its external ſurface is covered with a bright yellow oker. This ore, when crude, is not ſubject to the load-ſtone, but when calcined is powerfully attracted by it; and becomes extremely friable. Blueiſh colors with reddiſh ſhades are to be ſeen in it. It loſes 14 *per* 100 by calcination.

Produce *per* 100 { when crude, - - - 38
calcined, - - 45

In the firſt experiment with the crude ore, the regulus was well ſhaped, ſharp, and colorleſs. Calcination produces ſome

tough ſlags, a regulus well fuſed, but irregularly ſhaped, and of a yellow color in ſome places.

XXI. *Whitiſh iron ore.*

This comes from the neighbourhood of Echaterinenburg; it is very compact, ſoft to the touch, although of a clear whitiſh brown color; various colors, ſuch as black and yellow, appear on its broken ſurface. It ſeems to be compoſed of a ferruginous earth, combined with clay. Its external ſurface is of a dirty light yellow color. It is not much affected by the loadſtone till after calcination, when it ſtill preſerves its hardneſs, acquires ſome ſhades of red, and loſes 6 $\frac{1}{2}$ *per* 100.

This is a very poor ore; being not well ſeparated in a firſt experiment, the produce was expoſed a ſecond time to fuſion, and ſmall pieces of metal were obtained, well ſhaped, and yielding 6 *per* 100 for the produce of this crude ore.

XXII. *Solid iron ore.*

This is found in the neighbourhood of Echaterinenburg. I got it only in its calcined ſtate; it is then very compact. Its inſide exhibits various colors, and ſhining black, which ſhews its analogy to the hæmatites: in other places it is reddiſh and of a different grain. Several ſhining points may be obſerved in it, which appear like the mica. In ſome places points of a lively red may alſo be ſeen: it is ſlightly affected by the loadſtone, and its external ſurface is of a reddiſh hue.

This ore produces 54 *per* 100, ſome tough ſlags of deep yellow and red colors.

There is another mine worked near this of N° XXII, the ore of which differs only from the preceding, in producing 61 *per* 100.

XXIII. *Solid*

XXIII. *Solid iron ore.*

This comes from the neighbourhood of Echaterinenburg: it is calcined, black and reddiſh. The black parts are the hæmatites ſtriated longitudinally. It is ſparkling and ſhining in theſe places: it is but ſlightly ſubject to the loadſtone; it produces green ſlags, inclining to blue, a regulus well fuſed, irregularly ſhaped, of a lively yellow color, and 54 *per* 100.

XXIV. *Solid iron ore.*

Calcined ore from the neighbourhood of Echaterinenburg. It is a kind of hæmatites of a deep black color. It is compact, and ſhining where it is broken. There are cavities in it filled with a ferruginous earth, of a deep red in ſome places, and a lively red in others.

This ore is ſlightly affected by the loadſtone. It produces beautiful green ſlags, a regulus well ſhaped, ſharp, and 63 *per* 100. The regulus is yellow underneath, and in ſome places white.

XXV. *Solid iron ore.*

Calcined ore from the neighbourhood of Echaterinenburg. Its inſide is of a deep black color, but not bright: it is very friable; and ſhining particles are ſometimes to be ſeen in it.

This ore is more powerfully attracted by the loadſtone, than any I have yet mentioned. It produces ſlags of a violet color; a regulus well fuſed, irregularly ſhaped, of deep yellow, red, and blue colors, and 63 *per* 100. It contains a ſmall portion of copper.

XXVI. *Solid*

XXVI. *Solid iron ore.*

Calcined ore from the neighbourhood of Echaterinenburg: compact and hard. Different red colors are to be diſcerned on its inſide: ſome are inclined to brown, others are of a light red, and others again are only diſpoſed in ſmall ſpots much reſembling dull vermilion; it ſtains the fingers. Although it has loſt its chief properties by calcination, it ſtill appears very analogous to the hæmatites.

This ore is not ſubject to the loadſtone; it produces a regulus well ſhaped, ſharp, of a yellow color, and 54 *per* 100.

XXVII. *Solid iron ore.*

Calcined ore from the neighbourhood of Echaterinenburg. It is partly of a brown color inclining to black on its inſide; but when reduced to powder is of a deep red. Streaks may be obſerved in ſome parts of it, which bear a great reſemblance to the hæmatites: it is of a red color inclining to brown, and ſometimes lighter in the other internal parts. Its external ſurface is covered with a ſpongy ferruginous earth, of a deep red color: ſome black parts are diſtinguiſhable in it, ſmooth and ſhining, as in the hæmatites.

The loadſtone has no effect upon this ore. It produces green ſlags, a regulus well fuſed, irregularly ſhaped, of deep blue and yellow colors, and 61 *per* 100.

XXVIII. *Blackiſh iron ore.*

This is taken from the neighbourhood of Echaterinenburg; it is very ſolid and compact, and breaks into ſmall ſhivers. Some brown parts are apparent on the broken ſurface, among

which the mica ſhews itſelf; the other parts are of a dark black: all the parts are ſmooth and ſhining, and indicate the hæmatites in this place, but without any appearance of regularity. This ore, after calcination, becomes of a red color inclining to blue.

The loadſtone acts powerfully upon it when calcined; by which proceſs it loſes 15 *per* 100.

Produce *per* 100 { when crude, - - 53
calcined, - - 58 1/2

This ore produces green ſlags, and a ſpongy regulus, of deep blue and yellow colors.

XXIX. *Blackiſh iron ore.*

From the neighbourhood of Echaterinenburg. It is hard, compact, and very heavy, and breaks into ſmall ſhivers; it appears to be formed of two layers, the one of a black color rather inclining to blue, and the other of the ſame kind of ſubſtance, combined with yellow oker, ſomewhat inclining to red. Its outward ſurface is of a yellowiſh oker. The black parts of this ore ſeem very ſimilar to the hæmatites, without putting on any regular appearance. On the broken ſurface ſmooth and ſhining parts may be obſerved.

The loadſtone does not affect this ore in its crude ſtate, but acts upon it after calcination, by which it becomes friable, of a blueiſh color with different tints of red; and when pounded, is of a red color inclining to blue. It loſes 11 *per* 100 by calcination.

Produce { when crude, - - 52
calcined, - - - - 59

This ore, both crude and calcined, produces tough ſlags, a regulus well fuſed, and ill ſhaped, of a deep blue and rather yellowiſh colors.

XXX. *Brown*

XXX. *Brown iron ore.*

From the neighbourhood of Echaterinenburg; hard, compact and very heavy. It breaks into ſhivers; it is of a very fine grain, and its color in general is a deep brown. In ſome places ſtill browner parts may be obſerved, the grain of which is not quite ſo fine; theſe contain a great deal of the mica, and, in ſome ſpots, oker of a deep yellow. On the broken as well as on the external ſurface, ſome parts may alſo be obſerved of a beautiful black color, ſmooth and ſhining, and very analogous to the hæmatites.

The loadſtone acts upon this ore only after it has been calcined. It this ſtate it is very friable, of a red color conſiſting of three different ſhades, one of which is rather blueiſh. It loſes 12 *per* 100 by calcination.

Produce *per* 100 { when crude, - - 41
calcined, - - 50

This ore produces, after theſe two experiments, green ſlags, a regulus well ſhaped, ſharp, and colored.

XXXI. *Brown iron ore.*

This is found on the road from Echaterinenburg to Bilimbaeuſkoi. It is hard and very compact, breaks into ſmall ſhivers, and exhibits a ſmooth ſurface of ſo fine a grain, that it is impoſſible to diſtinguiſh the particles which compoſe it, even with a magnifying glaſs. This ore is of a deep brown color. Many cavities are to be obſerved in it, with layers of a black ſubſtance, ſhining and full of tubercles. This black ſubſtance appears to be the hæmatites. When this ore is pulveriſed it is of a deep yellow color.

In its crude ſtate it is not affected by the loadſtone, and very ſlightly when calcined; in which ſtate it becomes extremely friable; of a light blue, mixed with ſome red colors. It loſes 21 *per* 100 by calcination.

Produce *per* 100 { when crude, - - 53
calcined, - - 63

This ore, in its crude ſtate, produces green and tough ſlags, a regulus well fuſed, ill ſhaped, of yellow and lively red colors.

XXXII. *Brown iron ore.*

This is taken from the mountain of Guaſcheminskoe, near to Echaterinenburg, weſtward. It is hard and compact, and breaks into ſmall ſhivers. It is of a fine grain, eſpecially in thoſe parts which are analogous to the hæmatites; but the ſurfaces are not ſhining in theſe parts, as in the preceding ores. It is in general of a pretty deep brown color: ſurrounded in ſome places with a reddiſh oker, in others with a light yellow oker. This ore when reduced to powder is of a deep yellow.

In its crude ſtate it is not ſubject to the loadſtone, but is powerfully affected by it after calcination, by which it becomes very friable, and exhibits two different kinds of red, one of which is light. It loſs 16 *per* 100.

Produce *per* 100 { when crude, - - 43
calcined, - - 50

This ore, when crude, produces at firſt a regulus not well ſeparated; but on being fuſed a ſecond time, it comes out well ſhaped, ſharp, and colorleſs, as when it is calcined.

In the ſame mountain is found another ore reſembling that of N° XXXI. It is hard, compact, breaks into ſhivers, and the grain of the broken ſurfaces is ſo ſmooth, that the parts

which

which compoſe it can ſcarce be diſtinguiſhed with a magnifying glaſs. In ſome places it is of a yellowiſh brown, in others of a blackiſh brown color. In the laſt places there are ſome ſhining ſpots which indicate the hæmatites; but this is not regularly diſpoſed, nor is it furniſhed with any thing like tubercles. This ore is ſurrounded by oker of a reddiſh yellow color, and ſometimes whitiſh: it acquires a deep yellow when reduced to powder.

When crude, the loadſtone does not affect it, but acts powerfully upon it when calcined: it is then very friable, of a blue color, with red and whitiſh tints. It loſes 13 and a half *per* 100.

In its crude ſtate, it produces a ſpongy regulus, partly in grains, colored, and 51 *per* 100.

The mountain in which theſe two ores are found, is three leagues diſtant from Echaterinenburg: the ore is diſpoſed by heaps, in kinds of pits which are from 15 to 30 feet in diameter, and generally 25 feet deep. Theſe mines extend over a ſpace of 1700 toiſes from ſouth to north, and 200 toiſes from eaſt to weſt. When the turf is raiſed, a yellowiſh earth, two feet thick, preſents itſelf, and immediately below this the mine appears. The ore is found in looſe lumps, of irregular and oftentimes odd figures: theſe lumps are commonly ſurrounded with a yellow and reddiſh oker, more or leſs deeply colored; they are often prodigiouſly large, weighing as much as three thouſand weight. Mattocks, however, are the only inſtruments uſed for ſeparating them from the maſs, and they are broken with a hammer. At other times they are only two or three inches in diameter. They are incloſed in a ferruginous earth combined with clay, and in a kind of very rich mine in grain, which however is never worked. There is no kind of calcareous matter in any of theſe mines, of which I convinced myſelf both on the ſpot,

and at Paris, by examining the different earths I brought with me.

The ore in lumps is not equally plentiful every where. When one pit is worked out, another is ſought for by following the metallic channels, by means of which all theſe pits communicate with each other. I counted one hundred of theſe upon the ſpot. It is reckoned in the country, that the ore, in lumps, produces 50 *per* 100, and that in grain, 40.

XXXIII. *Solid iron ore.*

This comes from the neighbourhood of Echaterinenburg. Although calcined, it is very ſolid, compact, and of a blackiſh brown color: there is a little of the hæmatites to be obſerved in it, and it abounds with cavities, full of a deep red colored ferruginous earth. It is attracted by the loadſtone. It yields a regulus badly ſeparated at the firſt fuſion: but being ſet on to the fire again, the ore is obtained in ſmall grains, well ſhaped, of a pale yellow; and 44 *per* 100 is produced.

XXXIV. *Brown iron ore.*

This comes from the neighbourhood of Echaterinenburg. It is hard, compact, breaks into ſmall ſhivers, and is of a light brown amber color. Although there are but few particles which ſeem to partake of the hæmatites, yet I believe it bears a great analogy to that ſtone.

The loadſtone does not affect this ore when crude, but acts powerfully upon it when calcined. It then becomes friable, of a blueiſh color. It loſes 10 *per* 100 by calcination.

Produce *per* 100 { when crude, - - - 56
calcined, - - 64

In

In its crude ſtate it produces green ſlags, a regulus well ſhaped, ſharp, of yellow, red and blue colors. When it is calcined the ſlags are alſo green, the regulus irregularly ſhaped, very ſharp and colored.

XXXV. *Solid iron ore.*

Calcined ore from the neighbourhood of Echaterinenburg. In this ſtate it is hard and compact, uneven on its broken ſurface, of a reddiſh brown color, and in ſome places blackiſh. This ore is ſcarce affected by the loadſtone. The firſt fuſion does not ſeparate it well, the ſecond produces a regulus well ſhaped, ſharp, of a yellowiſh color, and 56 *per* 100.

XXXVI. *Brown iron ore.*

From the neighbourhood of Echaterinenburg; hard, compact, of a clear brown color, and an equal ſhade on its broken ſurface: where one may however obſerve one layer covered with a black color like velvet. This matter placed between the two layers has no degree of thickneſs. The grain of the ore is very fine, and furniſhed with the mica. Several parts of its external ſurface are full of tubercles, where ſome ſhining particles may likewiſe be ſeen; ſo that, according to all appearances, this ore is very analogous to the hæmatites. It is of a red color, mixed with yellow, when reduced to powder.

The loadſtone does not affect it in its crude ſtate, but acts powerfully upon it, after calcination; by which it becomes friable, of a beautiful deep red, and loſes 15 *per* 100.

Produce *per* 100 { when crude, - - 69
calcined, - - 79

This ore, both in a crude and calcined ſtate, produces green, tough ſlags, and a ſpongy regulus, colored.

XXXVII. *Brown iron ore.*

From the neighbourhood of Echaterinenburg; hard, compact, uneven on its broken ſurface, of a blackiſh brown color, and a tolerably fine grain. There are cavities in it full of a very hard cryſtallization, but without any regularity. This cryſtallization ſhould ſeem to indicate native iron: it is of the moſt beautiful black: and ſome ſhining particles are obſerved on its outward ſurface, which partake of the hæmatites. This ore is of a dull red color when pulveriſed: it is but little affected by the loadſtone, and that only when calcined: it is then friable, colored with red, and produces a fine deep red color when ground.

Produce *per* 100 { when crude, - - 50
calcined, - - 54

The crude ore yields a regulus, irregularly ſhaped, of a yellow color; and when calcined, a regulus, well ſhaped, ſharp, and colorleſs.

XXXVIII. *Brown iron ore.*

From the neighbourhood of Echaterinenburg; hard, compact, uneven on its broken ſurface, and of a grain rather coarſe. Its general color is a lightiſh brown, and in ſome places a ſhining black, like a beautiful varniſh. It indicates the hæmatites; and ſometimes even tubercles are to be obſerved in it. This ore, when powdered, is of a duſky red. When crude, it is not ſubject to the loadſtone, but it is powerfully attracted by it when calcined: it then becomes friable, and of a red color inclining to blue.

Produce *per* 100 { when crude, - - 41
calcined, - - 47

The

The crude produce required a ſecond fuſion, the regulus was then well ſhaped, ſharp, and colorleſs.

XXXIX. *Black botryoid hæmatites.*

Iron ore from the neighbourhood of Echaterinenburg. The tubercles of this hæmatites ſeemed to have been formed like the ſtalactites, but with ſtriated concentric layers. It is of a black ſhining color on its ſurface, as alſo at its broken parts: it breaks into ſhivers, and the ſtriæ divide into diſtinct needles like thoſe of antimony: theſe are likewiſe brittle. This hæmatites is formed upon a common iron ore, hard, compact, and of a dark brown color with ſome yellow ſhades. The hæmatites, reduced to powder, is of a deep yellow, as well as the ore; but the color of the ore is the lighteſt: they are neither of them attracted by the loadſtone. Having calcined a piece which contained theſe two ores, the hæmatites preſerved its color, but loſt its brightneſs; the iron ore became of a reddiſh black. I afterwards reduced theſe two ſubſtances to powder, the hæmatites was gritty to the feel, of a dark brown inclining to a reddiſh color: the iron ore pulverized was ſofter to the touch, reſembling the hæmatites in color, but lighter. The loadſtone acted powerfully on this ore; it alſo acted on the hæmatites but not with any conſiderable force. I repeated this experiment ſeveral times, and found that the loadſtone acted even more readily on the ſmall needles, which were not reduced to powder. As I did not think it neceſſary to give up this piece for experiments, I could not determine the produce of this ore; beſides that ſome idea may be formed of it from what has been ſaid.

XL. *Solid iron ore.*

This comes from the neighbourhood of Bilimbaeuſkoi; it is calcined, hard, compact, of a dark red color with brown

ſhades, uneven on its broken ſurface: the grain of it is coarſe, and contains a great deal of the mica. When pulverized it is of a beautiful deep red, and hardly affected by the loadſtone.

This ore produced, by a ſecond fuſion, a regulus well ſhaped, ſharp, and 47 *per* 100.

XLI. *Solid iron ore.*

Calcined ore from the neighbourhood of Bilimbaeuſkoi; it is very hard, extremely uneven on its broken ſurface, and of a blueiſh color: its keeps its color, after it is pulverized; with this difference, that it then becomes darker: it is as powerfully attracted by the loadſtone as filings of iron are. It produces a regulus well fuſed, irregularly ſhaped, of a yellow color in ſome places, and 62 *per* 100.

XLII. *Brown iron ore.*

From the neighbourhood of Echaterinenburg; hard, compact, of a fine grain, and ſmooth on its broken ſurface. It is diſpoſed in lamellæ, divided by a beautiful black layer of no thickneſs. This ſubſtance ſurrounds the ore in ſome places; it is ſhining, and reſembles the hæmatites (N° XXXVIII.) The ore is of pale brown inclining to a reddiſh color. In ſome places, chiefly on its outſide, oker may be obſerved. This ore, when pulverized, is of a yellowiſh color inclining to brown, not ſubject to the loadſtone, but powerfully attracted by it when calcined; it then becomes friable, blueiſh, with reddiſh ihades, and of a fine deep red color, when pounded. It loſes 13 $\frac{1}{2}$ by calcination.

Produce *per* 100 { when crude, - - 37 $\frac{1}{2}$
calcined, - - 43

This

This ore, when crude, required a ſecond fuſion: after which it produced a regulus well ſhaped, ſharp, and colorleſs, as when calcined.

XLIII. *Blackiſh iron ore.*

From the neighbourhood of Echaterinenburg; compact, hard at its broken ſurface; blackiſh, ſhaded in ſome places with a reddiſh color, in others with a fine ſhining black, indicating the hæmatites, but is of no thickneſs. It abounds with numbers of little tubercles. In the reddiſh parts the mica is found: the grain of the ore is tolerably fine; in theſe parts it is porous, and its broken ſurface uneven.

This ore, pulverized, is of a deep yellow, and not affected by the loadſtone; when calcined, it is hard and ſolid, of a dark black color, but dull; when reduced to powder, after calcination, it acquires a reddiſh black color, and is powerfully attracted by the loadſtone. It is reckoned, in the country, to produce 52 *per* 100.

XLIV. *Brown iron ore.*

From the neighbourhood of Echaterinenburg, partly decompounded: the ſolid part is hard, in general compact, and of a light brown color; but ſeveral layers are to be diſcerned in it. Some of them are compoſed of light yellow oker; and theſe have commonly very little thickneſs: the others bear a great reſemblance to the black hæmatites. Theſe laſt are ſometimes half a line thick: the decompounded parts conſiſts of a fine light yellow oker, ſometimes mingled with blackiſh ſhades, In the ſolid parts of this ore, which have no analogy to the hæmatites, a ſmall portion of the mica may be diſtinguiſhed, with ſeveral cryſtalline particles. It contains many irregular cavities.

This ore, when pulverized, is yellowiſh, and not affected by the loadſtone; when calcined, it is blueiſh, and ſhaded with red veins; if pulverized, after calcination, it is then powerfully attracted by the loadſtone, and acquires a fine deep red color. It loſes 13 *per* 100 by calcination.

Produce *per* 100 { when crude, - - 44½
calcined, - - - 50

This ore, both crude and calcined, produces a regulus well ſhaped, ſharp, and colorleſs.

XLV. *Rocky iron ore.*

From the neighbourhood of Echaterinenburg. It is a kind of yellowiſh grit, porous and hard. The particles of ſand are coarſe and equal. It is ſhaded in ſome places with a blackiſh color; this ſeems to indicate the exiſtence of the iron, which is clearly ſeen by the naked eye at the broken parts; where it is ſcattered about in different places in ſmall blueiſh and ſhining ſpangles.

This ore, pulverized, is of a deep yellow, it is the only one in which I have hitherto found particles in this ſtate affected by the loadſtone without being calcined. When this duſt is expoſed to the loadſtone, the particles of iron diſengage themſelves to fix upon the loadſtone, like the filings of iron. This ore, when calcined, is of a blackiſh brown, and becomes ſtill more ſubject to the powers of the loadſtone. It appears to me, that there is but a very ſmall quantity of the ſulphur that mineralizes the iron in this ore; but the metallic part is not for this reaſon more plentiful; for the ore is ſo poor that it is never worked. It loſes 8 *per* 100 by calcination.

XLVI. *Brown*

XLVI. *Brown iron ore.*

From the neighbourhood of Echaterinenburg; hard, compact, and heavy. It is compoſed of different ſubſtances irregularly diſpoſed; one is of a pale brown, another blackiſh, and a third of a yellow oker, ſolid in ſome places. The brown ſubſtance is uneven at the rugged broken part; the grain of it is coarſe, and interſperſed with ſeveral ſhining cryſtalline particles. The blackiſh ſubſtance is in general of a very fine grain; the parts which compoſe it are not to be diſtinguiſhed by the naked eye. It ſeems very analogous to the hæmatites, which is found in ſome parts of it. Its broken ſurfaces are ſmooth and ſhining, and the grain cannot be here diſcerned even with a magnifying glaſs. The oker appears to be a decompounded part of the ore.

This ore, pulverized, is of a duſky red; it is but ſlightly affected by the loadſtone, and that only when calcined: it is then friable, blueiſh, with various tints of red: when pulverized, it acquires a deep red color, and yields conſiderably to the loadſtone. It loſes 12 *per* 100 by calcination.

Produce *per* 100 { when crude, - - 42
calcined, - - 48

This ore produces, in both theſe experiments, a regulus well ſhaped, ſharp, and colorleſs.

XLVII. *Brown iron ore.*

From the neighbourhood of Echaterinenburg; hard and moderately heavy, of a fine grain, ſpongy in ſome parts, and ſeems to indicate the hæmatites. The yellow oker ſurrounds it, and ſome of this may be perceived on its inſide, chiefly in the cavities which are found there.

This

This ore, pulverized, is yellow, reddiſh, and not acted upon by the loadſtone. Calcined, it is friable, blueiſh, and powerfully attracted by the loadſtone. It loſes $16\frac{1}{2}$ *per* 100 by calcination.

Produce *per* 100 { when crude, - - 52
calcined, - - - - 58

This ore, when crude, produces green, tough, colored ſlags. When calcined, the regulus is well ſhaped, ſharp, and colored.

XLVIII. *Solid iron ore.*

Calcined ore from the neighbourhood of Echaterinenburg; hard, compact, and heavy; of a black color inclining to blue, and brown in ſome places. The hæmatites may be ſeen diſperſed indiſcriminately through it, and ſome reddiſh oker.

This ore, pulverized, is of a duſky red, and is affected by the loadſtone. It produces a regulus irregularly ſhaped, of a yellow color, and $55\frac{1}{2}$ *per* 100.

XLIX. *Blackiſh iron ore, cubic and cellular.*

This is taken from the neighbourhood of Echaterinenburg; it is partly ſolid and hard, partly cellular. The ſolid part conſiſts only of cubes of the ſize of common dice: there are, however, ſome of them whoſe ſurfaces are not more than four lines over. Theſe cubes are irregularly diſpoſed. On all their ſurfaces, longitudinal fibres, parallel to the ſides, may be obſerved; but the fibres of one ſurface always run in a contrary direction to thoſe of another. The outſide of theſe cubes is ſhining, and of a blackiſh color, and the ſubſtance, when pulverized, acquires a yellowiſh brown color. The loadſtone has ſcarce any power over it, only attracting, very inconſiderably, ſome of its parts. When it is calcined, its color is then a dark

reddiſh brown. The ore, in which theſe cubes are found, is of a blackiſh brown, as hard and as compact as the cubes; its grain is fine at the broken part, and tolerably ſmooth. When pulverized, it is of a yellowiſh brown inclining rather to red, and the loadſtone has no effect upon it. The cellular part reſembles a honeycomb, with this difference, that the cells are of various forms. Their ſides are not the 20th part of a line thick. Theſe cells are ſometimes found empty, ſometimes filled with a black ſubſtance, and at other times with a dark brown kind of matter. The general color of the cellular part of this ore is brown inclining to black: when pulverized, it is of a brown inclining to yellow, and not attracted by the loadſtone: it becomes ſubject to it in a ſlight degree when calcined, and its color then becomes black inclining to blue.

The ſolid part of this ore is covered externally with a layer of bright yellow oker. In ſome parts are obſerved collections of mica mixed with this oker, and between the cubes there are cavities lined with cryſtallizations of a cryſtal matter. This cryſtallization ariſes in little tubercles of a yellowiſh brown color, and is certainly produced by the metallic part: it ſometimes covers the faces of the cubes. This ore loſes 11½ *per* 100 by calcination.

Produce *per* 100 { when crude, - - - 45
calcined, - - - 54

When crude, it requires a ſecond fuſion; it produces then a regulus well ſhaped, ſharp, and of a yellow color; as it does likewiſe when calcined.

L. *Blackiſh iron ore.*

From the neighbourhood of Echaterinenburg; compoſed of two ſubſtances; one of a blackiſh color inclining a little to red; and the other of a dirty brown. The blackiſh

ſubſtance

ſubſtance is hard and compact: its grain is fine, and ſmooth on the broken ſurface. In ſome parts a ſhining matter may be obſerved, indicating the hæmatites. There are ſome cavities in it, the inſide of which is lined with cryſtallized tubercles of a dull black color.

The other dirty brown ſubſtance is but in ſmall quantity; it is tolerably hard, porous, rugged, and of a moderate conſiſtence. This ore, when pulverized, is of a yellow color inclining a little to red; it is not then affected by the loadſtone, but is powerfully attracted by it when calcined: it is then friable, blueiſh, and, when pulverized, of a dark brown reddiſh color. It loſes 13 *per* 100 by calcination.

Produce *per* 100 { when crude, - - 45
calcined, - - 52

The crude ore requires a ſecond fuſion: it then produces a regulus well ſhaped, ſharp, and colorleſs, as when it is calcined.

LI. *Blackiſh iron ore.*

From the neighbourhood of Echaterinenburg; friable, diſpoſed in bright ſcales, of a deep black color: it contains but a little iron, and a great quantity of copperous pyrites. The mine is not worked.

LII. *Reddiſh brown iron ore.*

This is found in the low mountains ſituated to the eaſt of Melechina, and to the weſt of Verchaturia. It has ſcarce any conſiſtence, being nothing more than a ferruginous earth, the parts of which are ſomewhat conſolidated; it is of a reddiſh brown color. In ſome parts of it are found ſilky copper fibres, which in other parts are cryſtallized under the form of vitriol.

It is not affected by the loadſtone even after calcination. It is then very friable, of a deep red, and when pulverized of a beautiful red inclining to blue. It loſes by calcination 21 *per* 100: and produces green ſlags, a regulus well ſhaped, ſharp, of a bright yellow, and 52 *per* 100.

LIII. *Brown iron ore.*

From the mountains ſituated weſtward of Zernoiſtoznſkoi, northward of Echaterinenburg. It is compoſed of different ſubſtances confuſedly mixed together; but they each of them preſerve their particular caracteriſtics. In ſome places the ore is of a ſhining black, in others dull; it is of a fine grain; theſe parts ſeem to bear ſome analogy to the hæmatites: the other parts indicate nothing more than a ferruginous earth, of a brown color inclining to yellow, ſometimes a dark brown. There is much cryſtal diſperſed in the inſide of this ore. It becomes friable by calcination; and when pulverized is of a dark red color, and is not affected by the loadſtone.

It loſes by calcination 13 *per* 100, and produces a regulus well fuſed, ſome red colors, and 39 *per* 100.

LIV. *Brown iron ore.*

From the neighbourhood of Echaterinenburg; hard, compact, of a rough grain. A great deal of mica may be obſerved in it, and upon its outſide a layer of a light red color, which appears to be cinnaber. It alſo contains a black ſhining ſubſtance, which is owing to the hæmatites. This ore when pulverized is of a beautiful red, and is not affected by the loadſtone. When calcined, it preſerves its hardneſs; the colors are deeper and of a fine red; and when pulverized, after calcination, the loadſtone acts upon it. It loſes 13 *per* 100, and

produces a regulus irregularly ſhaped, of red and blue colors; and 47 *per* 100.

LV. *Blackiſh cryſtallized ore.*

Found in the neighbourhood of Bilimbaeuſkoi. It is a ferruginous earth, hard in ſome places; but in general of a moderate conſiſtence. It is full of browniſh cryſtals, diſpoſed in leaves, but unequally diſtributed. They ſometimes form ſmall cells, filled with a blackiſh ferruginous earth, which is at other times of a bright yellow. The general color of this ore is that of ſnuff. The loadſtone has no effect upon it, and but little when it is calcined; it then becomes friable, of a very deep red color inclining to blue. It loſes 18 ½ *per* 100, and produces a regulus well ſhaped, ſharp, colored, and 47 *per* 100.

LVI. *Blackiſh iron ore.*

From the neighbourhood of Echaterinenburg; hard, compact, heavy, of a very fine grain in its blackiſh parts, and coarſer in thoſe which are of a light reddiſh brown. There is a ſmall quantity of mica to be obſerved in it, and ſome parts of a ſhining black, which ſeem to indicate the hæmatites. This ore, pulverized, is of a yellowiſh brown, and is not affected by the loadſtone. Calcination gives it a red color inclining to blue: it is of a very deep red when pulverized, and yields to the loadſtone. It loſes 15 *per* 100 by calcination.

Produce *per* 100 { when crude, - - 44½
calcined, - - 49

This ore produces green tough ſlags and a ſpongy regulus, deeply colored. The ſame appearances are obſerved when it is calcined, with this difference, that the regulus is then well ſhaped.

LVII. *Blackiſh*

LVII. *Blackiſh iron ore with ſhining points.*

This is found in the neighbourhood of Echaterinenburg: it is compoſed of a black ferruginous earth, a fine yellowiſh ſand, white ſhining points, ſome of which are mica, others cryſtal. A copperous earth is alſo to be obſerved in it. This metal ſometimes appears in it under the form of ſilky copper, and is often cryſtallized as rough emeralds. Theſe ſeveral ſubſtances form a kind of granite, friable and very light, and a greyiſh ſand when this is pulverized. This ore exhibits nearly the ſame appearances after calcination, with this difference, that the loadſtone then attracts ſlightly ſome of its parts. It loſes 13 *per* 100. It is ſo poor an ore, that in the experiments made on ſmall quantities, there are ſcarce any particles of iron to be extracted: it ſeems to be richer in copper.

LVIII. *Iron ore of a yellow ſaffron color.*

From the neighbourhood of Echaterinenburg. It is a ferruginous earth of a ſaffron color, light and ſo friable that it may be rubbed to powder between the fingers. It then falls into a kind of ſand, which tinges the fingers with a bright yellow inclining to a ſaffron color. In ſome places blackiſh parts may be obſerved, ſome mica, and ſeveral copperous parts of a green color, ſometimes under the form of ſilky copper. Cryſtals are alſo found in it, and a ſaponaceous ſubſtance reſembling the aſbeſtus.

This ore, calcined, is eaſily pulverized; the loadſtone then attracts ſome of its particles. It contains ſo little iron, that it is ſcarce poſſible to obtain a few particles from experiments made on ſmall pieces; it appears richer in copper.

Remarks on the iron mines of the Poias or Ryphæan mountains in Siberia.

In all the ores I have mentioned, the iron is mineralized by ſulphur, and combined with a vitrifiable earth, often with clay; but I never found any calcareous earth mixed with any of them. I convinced myſelf of this while I was in Siberia, in the mines I viſited there, and have been farther confirmed in the opinion by an accurate obſervation I made of the fact at my return to Paris.

Of all theſe mines, to the number of ſixty-one, taken from different places, there is not one diſpoſed in veins. They are all found in heaps, ſcattered here and there; and ought therefore to be reckoned among the ores, carried by ſome revolutions in the earth, from one place to another.

Among all theſe ores, there is but one (N° XLV.) which is attracted by the loadſtone; all the reſt require calcination, after which they become more or leſs affected by it.

Theſe mines, although in heaps, and diſperſed to all appearance without order, do ſtill obſerve one unvariable rule. All thoſe from the neighbourhood of Echaterinenburg; bear a great analogy to the hæmatites; and they are alſo the richeſt. Thoſe from Bilimbaeuſkoi have a greater reſemblance to rocky ores, and ſome of them appear to have been expoſed to fire in volcanos.

Theſe mines are almoſt always found in low mountains, and on the borders of rivers. They are not generally more than three feet below the ſurface; they are ſeldom more than four and twenty or thirty feet deep, and oftentimes much leſs. The bottom of them is on a level with the rivers, ſo that by the poſition of theſe mines, and the levelling of the road, the height

height of each particular mine might be determined with reſpect to the level of the ſea; but it will be ſufficient to determine the mean height of the bed in general, by calculating the height of the higheſt and loweſt points.

The higheſt place, where the iron ore is to be found, is on the river Czauſova, ſouthward of Bilimbaeuſkoi, eighteen leagues diſtant from thence, and this place is 272 toiſes above the level of the ſea *.

The mouth of the river Koſwa may be reckoned as the loweſt place where the iron ore is to be found: it is 184 toiſes above the level of the ſea †.

It is therefore certain, that the higheſt iron mines in the Poias or Ryphæan mountains, are raiſed 272 toiſes above the level of the ſea, and the loweſt 184 toiſes; if the medium between theſe two reſults is therefore taken, the mean height of the known mines of iron will turn out to be 128 toiſes above the level of the ſea; whereas the higheſt meaſured mountains are 471 toiſes high, others are 309; the mean height, therefore, of theſe mountains is 290, and the ſoil or plane, upon which theſe mountains ſtand, is 150 toiſes.

From this calculation it appears, that the iron mines are found about 70 toiſes above the ſurface of the ſoil, or in the loweſt mountains: this agrees perfectly with their general poſition; for they are ſeldom found in the higher mountains, or in the middle of the chain.

* The height of Bilimbaeuſkoi is 252 toiſes, 5 feet, 11 inches; and the ſlope of the river Czauſova is 6 feet, 7 inches, 4 tenths per leagues; ſo that the diſtance of this place, from the iron mine being known, the height of that mine appears to be 272 toiſes.

† The mouth of the Koſwa is in the Kama, 26 leagues diſtant from Solikamſky, which is 187 toiſes above the level of the ſea; and the ſlope of the Kama being 1 foot, 11 inches, $\frac{2}{10}$ per league, the height of the Koſwa, at its mouth, will be 184 toiſes.

All theſe ores are calcined in the open air, before they are put into the furnaces. They are collected in heaps, two feet deep, upon piles of wood, arranged for that purpoſe in dry places. The lumps of ore are not in general more than about three or four inches in diameter.

Theſe mines produce an iron of a peculiar quality, ductile, or harſh and brittle. Thoſe which produce a harſh and brittle iron, are generally the richeſt, as the mines of loadſtone, and the chief part of thoſe from the neighbourhood of Echaterinenburg, moſt of which may be claſſed among the hæmatites; but it is uſual to mix ſeveral ſorts of iron ore together, combining ſuch as are malleable and ductile, with others which are rich, harſh, and brittle.

The iron ariſing from theſe combinations is perfect, and better for certain purpoſes than that of Sweden or Spain; it is pliable and ductile, and preſerves at the ſame time a degree of ſolidity, not to be found in Spaniſh iron. This iron is tough both when cold and hot, and its angles are ſmooth. If we ſtrike it with the ſharp part of a hammer, a dent is made in it as in lead; and when cold, it cannot be eaſily broken. Its grain is ſo fine, that it can ſcarce be diſtinguiſhed with the naked eye: its broken ſurface reſembles ſteel. It is indeed uſed in works of the greateſt nicety. I once took up a bar of it fifteen feet long, three inches wide, and ſeven lines thick; and having fixed it between two branches of a tree, I twiſted it readily about the tree, and brought it back again with as much eaſe, without ſplitting it, or making any cracks at the angles. I brought away ſome ſpecimens of it: our workmen were aſtoniſhed at the goodneſs of this iron, which is not ſufficiently known in France; if it was more known, it might turn out to the advantage of both nations.

For

For 100 poedes *, or 3300 weight of France, a measure of coal is consumed three arcins high †, three long, and two wide, (or 6 feet 7 inches high, 6 feet 7 inches long, and 4 feet 5 inches wide.)

Some of these forges bring to those in whose possession they are, 4000 roubles, or 20,000 French livres, after all expences are deducted; and there are 2000 roubles, or 10,000 livres, allotted for the workmen and other expences.

The contractor buys this iron at twelve French sous, *per* poede; he sells it again on the spot for 50 sous, and at St. Petersburg, by wholesale, at 80. It was conveyed, during the winter season, upon sledges, and in the summer by water. It is sold to the English, who are the principal traders. I was informed of all these circumstances at Echaterinenburg, from persons who superintended these mines.

I have not seen, in any place, iron forges better supplied and better kept than those which belong to Count Woronzof, near Echaterinenburg. The person who had the direction of them was a Russian, very well acquainted with this business. The mines of Bilimbaeuskoi belong to Count Strogonof. The forge consists of one furnace and three sledges: it produces 20,000 poedes *per annum*, or 660,000 quintals of France, which, in French coin, are worth 6000 livres, at 50 sous *per* poede. In 1761, this forge was in a very bad condition, most of the workmen having deserted.

* The poede is equal to 40 pounds of Russian weight, and 33 pounds of France.

† The arcin is equal to 2 feet, 2 inches, 6 lines $\frac{3}{10}$ of French measure, royal foot.

Of

Of the copper mines of the Ryphæan mountains in Siberia, and in the neighbourhood of Cazan.

I. *Grey coppery marle.*

This has ſome kind of conſiſtence, although it is friable. It is compoſed of two layers; aquafortis ſhews that a cretaceous ſubſtance abounds in each. It contains very little clay, and a great deal of coarſe ſand; ſo that this marle is not tough, but eaſily rubbed to powder between the fingers. One of the layers is grey inclining to a reddiſh color; a ſmall quantity of greeniſh copperous earth is to be obſerved in it. The other layer has ſcarce any thickneſs; it is of a ſea-green inclining to grey, which color is owing to the copper. Every circumſtance ſeems to indicate a diſſolution of this metal, the particles of which have been conveyed and depoſited in this marle. It is found in the neighbourhood of Cazan, and contains ſo little copper that the mine is not worked.

II. *Copperous ſchiſt of a dirty grey color.*

Some clay, ſand, and a green copperous earth is found in this ſtone. It does not effervesce with acids. It is diſpoſed in flakes, and breaks eaſily into ſhivers. Theſe three ſubſtances form a light ſtone, the parts of which are pretty well connected; it is of a coarſe grain, and of a dirty grey color inclining to green. It is found in the neighbourhood of Cazan.

III. *Greeniſh calcareous ſtone.*

This ſtone is hard and compact, compoſed of calcareous earth, of ſand, and of a copperous earth. This earth reſembles verdigreaſe;

verdigreaſe; and is ſometimes found in layers. The grain of this ſtone is coarſe, its parts are not very cloſely united; and it is eaſily reduced to ſand between the fingers. The copper appears to have been depoſited in this ſtone, as in that of N° I. It comes from the neighbourhood of Cazan. In many different places we find ſome marle and calcareous ſtones, ſimilar to thoſe of N° I. and III. Some contain more, others leſs copper. This metal is ſometimes depoſited in clay, but not frequently. I have brought away ſpecimens of all theſe: they differ ſo little from each other, that I have not ſpoken of them diſtinctly, in order to avoid repetitions. The copper is alſo ſometimes found in pure ſand, with ſcarce any mixture of calcareous earth. The metal is then diſpoſed in ſtrata, and ſometimes ſerves as a gluten to the ſandy particles, which are eaſily reduced to ſand.

IV. *Malachites.*

The malachites is found in the cavities of copper mines, under the form of ſtalactites and ſtalagmites. That of Siberia is very beautiful, may be poliſhed, and is fit for all kinds of jewels. It is ſometimes full of tubercles, fibrous, and diſpoſed in layers: it is produced by copper which has been in a ſtate of diſſolution.

1. *Tuberous malachites.*

This malachites is a ſtalactites, reſembling an acorn, full of tubercles, crowned with a cup of the ſame kind. The cavity, which receives the head of the acorn, is internally of a whitiſh green color, as the external ſurface of the acorn is alſo. Theſe two parts conſiſt of layers half a line thick, more or leſs. They are all of a different green, ſometimes of a fine ſea-

†

green, a deep and a blackiſh green. Each layer is of a homogeneous green; but with a magnifying glaſs it appears that theſe are compoſed of other layers: one may diſtinguiſh ten or eleven of them. The acorn is hollow, the cup concave on the inſide and convex on the out. This ſtone explains perfectly well the formation of theſe malachites. They ſeem to have been produced by ſtalactites formed by the ſide of each other, and covered by layers of the ſame kind of matter.

2. *Malachites.*

This malachites muſt have formed a layer covering ſome ſtalactites. The cavities which are in it indicate the number of the ſtalactites. The ſurface of the cavities is of a whitiſh green color, they are convex externally, and of a darker green. It is diſpoſed in layers, as the preceding.

3. *Malachites.*

This muſt have been a covering to ſome ſtalactites. It conſiſts of 11 layers, three quarters of a line thick, and each of theſe is compoſed of other layers of the thickneſs of a hair. The 11 layers are of a beautiful green color, more or leſs deep. The lighteſt is a deep ſea-green. Some blackiſh layers may now and then be diſtinguiſhed. This malachites is very hard, its parts are perfectly well combined; and it exhibits on its broken ſurface, and in ſome of the layers, only an appearance of perpendicular fibres, all tending to the center of the cavity, or the tubercle they belong to. The outward ſurface of this malachites is covered with other layers of the ſame kind of matter, whoſe cavities are in an oppoſite direction to the former.

4. *Tuberous*

4. *Tuberous malachites.*

This is the ſame malachites poliſhed on one ſide, and rough on its external ſurface. Each ſtalactites appears to be formed of different layers: the lighteſt of which are of a beautiful ſea-green. It is ſometimes found in the center of ſeveral ſtalactites, which are generally black, and ſurrounded with various layers of the ſame kind of matter, of a beautiful green color more or leſs dark, and mixed with other black layers. The intervals between the ſtalactites are filled up with the ſame kind of matter, diſpoſed alſo *per ſtratum.*

5. *Tuberous malachites.*

This malachites is poliſhed on both ſides. It differs only from ſome of the other malachites in its color, which is darker and more ſplendid.

6. *Tuberous malachites.*

This is formed by tubercles of different ſizes, collected in an irregular manner, and is covered with ſeveral layers of the ſame kind of matter. At its baſe one may diſcover ſome iron particles mineralized by ſulphur.

7. *Arboreous malachites.*

This might be ranged in the claſs of the tuberous malachites, but the tubercles are ſo diſpoſed, as to put on exactly the appearance of leaves in the broken parts. It is in other reſpects ſimilar to thoſe I have before mentioned, with this difference only, that it is very full of cavities.

8. *Striated malachites.*

This malachites is not tuberous as the others; it is compoſed of ſeveral layers, almoſt imperceptible to the naked eye, and of threads perpendicular to theſe layers, and tending to the ſame center. It is hard and compact, and there are no cavities in it as in the others.

9. *Malachites diſpoſed in horizontal layers.*

This differs entirely from the reſt, with reſpect to the layers which compoſe it. They are horizontal, half a line in thickneſs, generally of a dark green color, and ſome of them are blackiſh. One may obſerve ſome fibres in it perpendicular to theſe, chiefly in the upper layer; which makes one third part of the thickneſs of the malachites.

M. le Sage thinks, that the malachites is formed by the combination of a greaſy matter with the copper; and upon this principle makes an artificial malachites which produces, by analyſis, the ſame appearances as the natural foſſils *. By the experiments he made on the malachites of Siberia, he found that they produced 62 and 63 pounds of copper *per* 100. The malachites I brought with me from Siberia, have been taken from the copper mines ſituated to the ſouth of Solikamſky, and to the north of Souxon.

* This curious diſſertation has been read at the academy, and will appear in the third volume of the foreign memoirs.

M. le Sage diſſolves the copper by a volatile alkali, freed from the ſal ammoniac, by means of a fixed alkali. The volatile alkali acquires an azure color. This ſolution being expoſed to the air in a veſſel, the alkali is decompounded; its greaſy part remains combined with the copper, and gives it a green color. If the evaporation is made imperceptibly, cryſtals are obtained of the moſt beautiful green color, but collected without order; this is what he calls artificial malachites.

V. *Calcareous*

V. *Calcareous, copperous, greeniſh ſtone.*

This ſtone is hard, compact, and very heavy: it is compounded of a calcareous earth, of clay, ſand, and a coppery earth: there is but little of the calcareous earth in it. It ſhews a coarſe grain on its broken ſurface of a ſea-green color, and in ſome places a beautiful azure blue. This ore is found in the neighbourhood of Solikamſky.

VI. *Calcareous, copperous, reddiſh ſtone.*

This is compounded of a calcareous earth, of clay diſpoſed in flakes, of ſand, and of a copperous earth. This laſt is ſometimes found among the flakes of clay; where it is always combined with the calcareous earth. The copperous matter forms layers, not more than the ſixth part of a line in thickneſs. It is of a ſea-green, mixed with the ſand and calcareous earth. This ſtone is friable, and of a very coarſe grain.

VII. *Calcareous, copperous, and blackiſh ſtone.*

This is hard, compact, and of a fine grain. It appears entirely calcareous, and contains very little copper, which is, however, diſtinguiſhable in ſome parts of it by green and blue ſpots. This ore is found to the ſouth of Solikamſky.

VIII. *Copperous and blackiſh marle.*

This is diſpoſed in flakes; it contains a little ſand, ſome copperous green earth, and upon one of its ſurfaces there is the mark of a ſtriated texture, diſpoſed in the form of a fan. It is found to the ſouth of Solikamſky.

IX. *Marl.*

IX. *Marl of a greyiſh brown color, coppery and ferruginous.*

This marl is moderately ſolid. The clay is diſpoſed by flakes in it. The ferruginous earth is of a deep red, ſcattered here and there as well as the coppery earth. Theſe two metals are always combined in it with the cretaceous part. The copper is diſtinguiſhed by its green color. This is a very poor ore, and is found in the neighbourhood of Solikamſky.

X. *Coppery marl of a dirty grey color.*

This is mixed with ſmall ſand and a coppery earth, ſometimes green, ſometimes blue; it is very friable, and diſpoſed in layers; it is found northward of Niz-Czuſowoi, and is a very poor ore.

Beſides theſe ores, we find ſeveral copper mines in the Ryphæan mountains, from the 58th degree of latitude, as far as to the north of Solikamſky. I have brought ſpecimens of them from fourſcore different places; but as they are of the ſame nature as thoſe already ſpoken of, I ſhall not enter into a deſcription of them. The copper in theſe mines is always combined with the cretaceous part of the marl. All theſe mines are found in the lower or newly-formed mountains: theſe mountains appear to be all compoſed of marl, in which the cretaceous part prevails, and calcareous ſtones, ſometimes ſandy.

XI. *Calcareous coppery ſtone.*

This ſtone is hard, compact, and of a fine grain. It is compounded of a calcareous earth and ſmall ſand. In ſome places one may diſcover black argillaceous particles diſpoſed

in flakes. The copper is here joined with the ſmall ſand, and eſpecially with the earth, to which it gives a ſea-green color, ſometimes light, and often very dark. The coppery matter is ſometimes cryſtallized in ſmall cells like thoſe of the honey-comb, the ſides of which are very thin. The copper in theſe cryſtals appears to be combined with pure marl. This ore is pretty rich, and is found to the ſouth of Souxon.

XII. *Azure copper ore.*

This is hard, compact, and heavy. It contains a calcareous earth, ſome ſand, and copper. The metallic part gives various colors to the ſeveral layers which compoſe it; two of theſe layers are of a ſhining bright azure blue; thoſe in the middle are of a pale green. According to M. le Sage's opinion, mentioned under the article of the malachites, the copper in the azure part is mineralized by a volatile alkali, and, in the green part, by the greaſy matter produced from the volatile alkali decompounded. This ore is pretty rich, and is found to the ſouth of Echaterinenburg.

XIII. *Copper mineralized in ſand and in wood.*

In this ore ſome blend, or black jack, may be diſtinguiſhed, which at firſt appeared to me to be iron; it contains alſo ſome ſand, wood and copper. It forms a very hard and compact ſtone in the ſandy parts, and in thoſe which contain the black jack. The vegetable parts are ſo friable that they are eaſily ſeparated. The copper is diſtinguiſhed by large ſpots of a fine green graſs color. The wood is black, and reſembles a coal, the parts of which are combined with a greaſy earth. The copper is cryſtallized in ſeveral parts of this vegetable, under the form of ſmall cells ſuch as are before mentioned. They are ſometimes of a bright green,

green, deep and blackiſh, and moſt of them are ſhining; ſo that theſe cryſtallizations may be conſidered as vitreous. The copper is every where joined to a calcareous earth; which is not found but where the metal is. This ore is found northward of Souxon.

XIV. *Copper mineralized in a calcareous earth.*

This ore contains a little ſand, and a great deal of copper united to a calcareous earth: it is of a pale green, inclining to a ſea color. It is porous and pretty hard, and is found to the ſouth of Souxon.

XV. *Azure copper ore, mineralized in ſand.*

This is a ſandy friable ſtone, of a very coarſe grain. The copper is diſtinguiſhed in it with the naked eye, by a number of ſpots of a light azure blue. In ſome places this metal gives a greeniſh color to the ſand, which is of a dirty grey color; but by means of aqua fortis we find that the copper is always united to a calcareous matter. This ore is found to the ſouth of Echaterinenburg; and is pretty rich.

XVI. *Copper mineralized in ſand, and in wood.*

This ore differs only from that of N° XIII. in having a leſs quantity of ſand and black jack. There are many parts in it of an azure blue, ſometimes diſpoſed in layers, and frequently in ſpots. It is richer than that of N° XIII. and is found to the ſouth of Souxon.

XVII. *Copper mineralized in wood.*

It is evident from the ſpecimens I have brought of this, that it has belonged to a tree of at leaſt one foot in diameter: the inſide

inſide is reduced almoſt to a very friable coal, although its parts are combined with a greaſy kind of matter: the copper is ſometimes cryſtallized in ſmall cells, ſuch as thoſe before mentioned; but theſe cryſtallizations are only found in general among the fibres of the wood, which has entirely changed its natural appearance. The bark of the tree is diſtinctly ſeen in it, four lines in thickneſs: it is divided into two layers; one of an azure blue color, the other of a pale green, nearly the color of verdigreaſe. This wood is taken from the mines in the neighbourhood of Souxon. I have been told upon the ſpot, that whole trees were ſometimes found in the beds of theſe ores. I took the ſpecimens I brought with me, from a collection which filled the greateſt part of a room more than twenty feet long. The wood contains more or leſs copper, according to the different places it comes from: its colors are of various hues; but are always either green or of an azure blue.

The copper mines of Souxon extend round about this neighbourhood as far as 150 werſts, or 30 leagues. They are found in mountains which are an hundred toiſes high, and more eſpecially in thoſe whoſe ſlopes are conſiderable; they are diſpoſed in beds which follow the ſlope of theſe mountains; here they form irregular channels: theſe commonly unite in one principal channel, which is a kind of center, from whence the branches extend ſometimes the length of a mile. Theſe mines are generally placed nearly in the middle of the height of theſe mountains. They approach them by ſoughs digged in the ſides. They are about 78 feet deep. They are obliged to ſupport the earth with timber. They only uſe the mattock, and ſometimes the ſledge hammer.

The produce of theſe mines is but indifferent. The richeſt of them do not yield more than 4 *per* 100, and the others

much leſs. They are mixed one with another. I have had ſome ſpecimens of this ore from 70 different places, but they are all of the ſame nature, of which I convinced myſelf by the ſame experiments. The copper is always united to a calcareous earth: I have never found it in veins of quartz, nor mineralized by ſulphur, nor by arſenic.

XVIII. *Red copper joined to ſilken copper.*

The red copper is ſo very analogous to the red ſilver in this mine, that it is only to be diſtinguiſhed from this metal by fuſion. It is found ſcattered among the ſilken copper ore; which reſembles much the ſilken copper of China; but is more ſolid. I know not how this red copper is mineralized; but it appears to me, that it may be ranged in the claſs of virgin copper. The ſilken part of this ore is of a beautiful green; mixed with a little calcareous earth: it is as rich as it is ſcarce; and found in the neighbourhood of Echaterinenburg.

XIX. *Virgin copper by flakes.*

The virgin copper is found in this ore diſperſed in ſmall flakes, in a kind of reddiſh oker. The copper is of a yellowiſh red; one may diſcover, in ſome places, a ſmall quantity of calcareous earth; and in others it reſembles ſolid cinnaber. The oker is friable. This ore is found to the ſouth of Echaterinenburg. In the neighbourhood of this town may ſometimes be found ſome copper ore mineralized by ſulphur in quartz; but this is not common.

Remarks

Remarks on the copper mines of the Ryphœan mountains in Siberia.

The copper mines we are acquainted with in the Ryphæan mountains are never diſpoſed in veins; they are found in the lower or newly-formed mountains: where they are commonly diſpoſed in beds ſcattered here and there, and they often form different branches terminating at laſt in one. The mines of Solikamſky obſerve the firſt of theſe orders, thoſe of Souxon, the laſt. I was informed by people of the country, well verſed in theſe matters, that all the other copper mines are arranged in the ſame manner. This ſeems alſo to be indicated by the nature of theſe laſt ores, as they are all of the ſame kind. Some few of thoſe brought from the neighbourhood of Echaterinenburg are an exception to the general rule.

I have brought away 160 ſpecimens of copper ore from different places: they are all in marls or in calcareous ſtones, partly compoſed of ſand; but the metallic ſubſtance is almoſt always found in the cretaceous part, and oftentimes in wood, as in the neighbourhood of Souxon. The nature of theſe ores ſhews plainly, that they have been recently formed. It ſhould ſeem, as if the copper had been firſt diſſolved, and afterwards carried to, and depoſited in the places where it is found; but in this caſe we might expect to find it mixed indiſcriminately with the ſeveral kinds of matter of which theſe mountains are compoſed, whereas, on the contrary, it is only found united to the calcareous ſubſtances, whether theſe happen to be mixed with clay or with ſand.

Moſt of theſe ores are of an azure blue color, and the reſt are green, either dark, ſea color, or color of verdigreaſe. According to M. le Sage's ſyſtem, the azure ores are

mineralized by a volatile alkali, and the green part by a greaſy matter produced from the volatile alkali decompounded; ſo that the azure is changed into the green.

The copper mines from the 58 degree of latitude, to Soliamſky, ſituated in the 60 degree, are all found in marl, in which the cretaceous part commonly prevails, and ſometimes the argillaceous part. The low mountains ſituated weſtward of the Ryphæan mountains, are all of the ſame nature, from the 58 to the 60 degree of latitude.

Theſe mines are found at the depth of a few feet, and follow the courſe of the ſoil to the level of the rivers *. From theſe facts and from the levelling, the mean height of the metallic coppery bed of Oſſa at Solikamſky turns out to be 172 toiſes above the level of the ſea. There are alſo ſome copper mines to the eaſt of the Kama as far as Menzelinſk; but theſe are ſo poor, that it is not worth while to work them. I am little acquainted with this part of the ſoil, but from the ſpecimens I have had, it appears to be the ſame as the reſt. The height of the metallic bed in the confines of Menzelinſk, may be computed at 126 toiſes above the level of the ſea †. If this is compared with the height of Oſſa, which is 152, the mean height of the metallic bed, from the 55 degree and a half of latitude, to about the 57 degree and a half, will be 139 toiſes; whereas I have computed that from Oſſa to Solikamſky at

* From this account, Oſſa may be conſidered as the loweſt point of the metallic coppery bed, in the weſtern part of the Ryphæan mountains; and the mines to the north of Solikamſky, as the higheſt. Oſſa is 152 toiſes, Solikamſky 187, above the level of the ſea: the ſlope of the Kama, being then known to be one foot 11 inches, and ſuppoſing the ſlope of the ſmall rivulet Wiſzera to be the ſame, the height of the metallic bed in this place will be 192 toiſes; and ſince that of the Kama at Oſſa is 152 toiſes, the mean height of the coppery bed is therefore 172 toiſes. The mines in the neighbourhood of Souxon may be ranged upon the ſame plain, Solotoukouſka being 185 toiſes above the level of the ſea.

† The height of Menzelinſk is calculated from that of the Kama at Oſſa, and from the given ſlope of this river.

172; ſo that it riſes in proportion as it advances northward the length of the Kama.

We have ſeen that the mines in the neighbourhood of Echaterinenburg were different from the others; they are alſo ranged in a different plane. We find by the levelling * that the copper mines ſituated about the 57 degree of latitude, and mineralized by ſulphur in the quartz about the confines of this town, are 238 toiſes above the level of the ſea: and if the medium is taken between the three coppery beds; the mean height of the coppery bed will be found to be 183 toiſes above the level of the ſea.

Of the gold mines in the neighbourhood of Echaterinenburg in Siberia.

Theſe are almoſt the only ones which are found in quartz and diſpoſed in veins. I got plans of theſe mines, and went over them with the greateſt attention, with a deſign of giving a complete hiſtory of them. I marked all the obſervations I made upon the plans, and brought away ſpecimens of all the kinds of matter I found there.

Gold mines of Piſzminſkaia.

This mine is ſituated to the north of Echaterinenburg, in 78° 48′ of longitude, and 57° 4′ of latitude. The cham-

* The higheſt place where the copper ore is found in the quartz, is on the river Czauſova, 15 leagues to the ſouth eaſt of Bilimbaeuſkoi. The height of Bilimbaeuſkoi being given at 253 toiſes, and the ſlope of the river Czauſova at ſix feet ſeven inches, the height of this place will be found to be 264 toiſes above the level of the ſea. Koſulina, which is 213 toiſes high, may be conſidered as the loweſt place; and conſequently, the mean height of the copper mines is 238 toiſes.

bers

bers of this mine are directed from ſouth to north, and its veins from weſt to eaſt.

The gold ore is diſcovered by a white earth, inclining to a grey color, mixed with ſome layers of a ferruginous earth. The ſoil has been ſcarcely dug two feet deep, before the veins of gold make their appearance; they run 10 toiſes from weſt to eaſt, and ſometimes 30; and are four or five inches broad at the upper part, which is always the richeſt. The vein afterwards diminiſhes in breadth and quality, as it gets lower down. Theſe veins repreſent pretty exactly a ſemicircle, of which the upper part is the diameter. They are from two or three to 10 toiſes diſtant from each other, and rather inclined to the horizon. The matter which ſeparates them is a blueiſh hardened clay, which ſeems to contain ſome of the aſbeſtus, as well as the white earth already mentioned. We alſo find a vitrifiable earth in it, of a moderate conſiſtence, ſome yellow, black and red oker, pretty hard. The red oker is a ſure ſign of the vein not being rich; and as ſoon as it appears in any quantity, the vein is neglected. The mine is almoſt always terminated at the lower part, by a layer of this oker. This mine is 14 toiſes deep; and the water is found immediately underneath it.

The vein conſiſts generally of quartz, ſeparated in different places by various kinds of matter, which I ſhall mention hereafter. It is neceſſary, on account of theſe ſubſtances being ſlightly connected together, to prop up the chambers with timber. The wood is arranged in the ſame manner as in building the houſes in Ruſſia, ſo that in ſome places the ground cannot even be ſeen between the beams.

The gold is commonly ſeen in the quartz, and often in a very friable oker. It is found in ſmall ſpangles, which are ſeparated here, as every where elſe, by waſhing. There are workmen employed in conveying out of the chambers all the

ſubſtances

ſubſtances they find there. Such as appear to contain gold are laid in heaps near the criminals who have been condemned to labour in the mines. Their feet are chained down, and they are faſtened to a ſeat made from a piece of a rock. They ſeparate, with a hammer, the ore from the parts in which this metal is not apparent. Other workmen are buſied in collecting the ore, and carrying it to the mills prepared for grinding and waſhing it.

The veins of the quartz are ſeparated by ſand, by the white earth before mentioned, by clay, ſometimes ſolid, ſometimes ſoft, and by a grey ſtone, vitrifiable and pretty hard; but the form alone of the veins, and their direction from weſt to eaſt, obſerves ſuch an unvariable law, that it is difficult to imagine, how they can have been combined with the other ſubſtances, moſt of which appear to have been ſucceſſively conveyed into theſe places. A ſmall quantity of lead is found in the quartz, ſome pyrites, native ſulphur, and ſeveral brown cryſtals, like thoſe of Bohemia and Saxony. They differ only from thoſe cryſtals, which are called topaſes, in being a little harder.

The lower part of this mine is 206 toiſes above the level of the ſea.

I. *Gold mine of Bereſouſkoi.*

This is ſituated to the north of Echaterinenburg; in 57° 1′ latitude, and 78° 54′ longitude.

The veins of this are alſo diſpoſed in parallels, except in a few places. The direction of thoſe which are ſituated weſtward is from ſouth to north-weſt; conſequently, they make an angle of about 45 degrees with the eaſt. The direction of thoſe veins whoſe ſituation is eaſtward is more ſimilar to the veins of the mine of Piſzminſkaia, being frequently from weſt to eaſt; and ſuch veins as are thrown the fartheſt out of

this direction, make an angle of about 30 degrees from the eaſt towards the ſouth. The internal texture of the earth in this mine differs only from that of Piſzminſkaia, with regard to a few ſubſtances I ſhall now take notice of.

There is leſs quartz in the veins of the mine of Bereſouſkoi, than in thoſe of the former; and the gold is moſt commonly found in a black ferruginous earth, often cryſtallized in cubes. This is the richeſt of all the ores. Veins of vitrifiable ſtone of a grey color, ſometimes reddiſh, are alſo to be found in it. This ſtone is full of mica, and ſeveral ſmall brown cryſtals. At other times cubes of quartz and ferruginous earth form a layer five or ſix lines thick upon theſe ſtones, and upon others of ſand; to which they are ſo ſlightly attached, and ſo looſely connected, that they may eaſily be ſeparated with the finger. This ſtone is likewiſe found in veins where iron is cryſtallized in cubes. I have already mentioned theſe in ſpeaking of the iron ores. Theſe two cubic iron ores are the ſame. Having deſired M. le Sage to analyſe them, he found that theſe cubes produced 70 pounds *per* quintal; and, according to this learned chymiſt, the iron is mineralized in them by a marine acid *. The bottom of the mine is 200 toiſes above the level of the ſea.

II. *Gold mine of Bereſouſkoi.*

In 70° 50′ of longitude, and 57°. of latitude. The veins may likewiſe be conſidered as parallel: ſome of them, however are directed from weſt to eaſt, while others make an angle of about 23° from the eaſt towards the ſouth, and

* M. le Sage intends to preſent to the Royal Academy of Sciences, a diſſertation upon this cubic ore, for which reaſon I have not enlarged upon it. It differs, however, from that of Nº XLIX, as the cubes are larger, and that, when reduced to powder, it is ſlightly attracted by the loadſtone.

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from the eaſt towards the north. The internal texture is in other reſpects the ſame as the firſt; and the bottom of the mine is 201 toiſes above the level of the ſea.

Gold mine of Ouktous.

In 78° 49′ of longitude, by 56° 50′ of latitude Moſt of the veins are in the ſame manner parallel: others make an angle of about 20° and ſome of 40° from the eaſt towards the north. The internal texture of the earth is nearly the ſame as in the mine of Bereſouſkoi, with this difference, that the veins in the mines of Ouktous are ſometimes 63 toiſes in length, whereas in the other they do not exceed twenty toiſes. The bottom of the mine is 216 toiſes above the level of the ſea.

Gold mine of Chilovoitoetſe.

In 79° 17′ of longitude, by 56° 31′ of latitude. The veins are ſomewhat irregular, but their general direction is ſuch as to form an angle of about 25° from the eaſt towards the ſouth. The veins are about 40 toiſes long; and the bottom of the mine 207 toiſes above the level of the ſea.

The produce of theſe mines is ſo trifling, that it does not always clear the expences, although labour is at an exceeding low price, on account of the ſlaves who are employed there. The ſilver mines are not worth mentioning. They are leſs uſeful to the kingdom of Ruſſia, than they are to natural philoſophers, to whoſe conſideration they preſent a number of intereſting inquiries.

We have ſeen that the mine of Ouktous was the higheſt of all theſe, being 216 toiſes above the level of the ſea, and that of Bereſouſkoi, of 200 toiſes, the loweſt. Conſequently, the

mean height of this metallic bed is 208 toiſes. I have determined that of the coppery bed at 183 toiſes, and that of the ferruginous bed at 228 toiſes. The beds of iron and thoſe of gold are therefore nearly of an equal height: and if we recollect what has been ſaid in the account of the iron ores, it is certain that they are all in vitrifiable ſubſtances, among which I have not found the ſmalleſt particle of calcareous matter. I have made the ſame obſervation, on upwards of fourſcore ſpecimens of gold ores, with this difference, that theſe are found in quartz. The copper is the only ore found in a calcareous matter. Theſe ſeveral facts ſeem to point out the height of the vitrifiable and of the calcareous matter in this chain. They are founded on a number of obſervations, concurring to eſtabliſh this truth; which has been farther confirmed to me by all the inquiries I have made on the ſpot, in the courſe of my journey, either northward or ſouthward. In all the lower parts of theſe mountains I have conſtantly found calcareous ſtones, and vitrifiable ſtones in all the higher parts.

It follows, therefore, from theſe ſeveral obſervations, that the calcareous matter riſes in theſe mountains as high as 183 toiſes; this is ſtill farther confirmed by the height of the vitrifiable matter, which is found at 218 toiſes. In the laſt heights the gold and iron mines are placed, in the firſt the copper mines.

I have determined the height of the moſt elevated plane of Ruſſia, from St. Peterſburg to Tobolſky, at 185 toiſes above the level of the ſea; and the mean height of the chain ſtanding upon this plane, at 270 toiſes; from whence it may be concluded, that the copper mines and the calcareous earths terminate at the height of this firſt plane, and that the gold and iron mines are found at the lower part of the vitrifiable ſubſtances, at 52 toiſes above the mean height of the chain.

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As moſt of the ores appeared to me, on the ſpot, recently formed, and conveyed there, I imagined that the real mines ſhould be ſearched for in the middle of the chain, in higher places; but I was informed by the directors of theſe mines, and by all the miners I conſulted, that frequent attempts had been made to look for them in theſe places, but as theſe attempts had always been fruitleſs, the deſign was now quite given up.

I ſhall cloſe this article, with ſome remarks on the teeth of the Mamout, ſo much talked of by travellers. Monſ. d'Aubenton has demonſtrated that theſe teeth, were the real elephant's tuſks. I have brought pieces of ſome of them, which muſt have belonged to an elephant of the largeſt kind. We cannot diſcover by any aſtronomical knowledge, whether the temperature of this climate was ever ſimilar to that in which theſe animals are produced.

M. Franklin, a celebrated Engliſh natural philoſopher, informed me, as he went through Paris, that he had found ſeveral tuſks in America, which were ranged in the claſs of elephant's tuſks: and told me at the ſame time, that they had found ſeveral jaw bones there belonging to the ſame animal. I deſired him to get me one of thoſe jaw-bones, which he was ſo kind as to ſend me. It was found out here not to be the jaw of an elephant; but, at the ſame time, nobody knows what animal it has belonged to If there were any accurate obſervations which made it evident that there are in America tuſks ſimilar to thoſe of the elephant, as M. d'Aubenton has made it appear concerning the tuſks found in Siberia, and if it could likewiſe be proved, that the jaws I received from M. Franklin belong to the ſame animal, it would then be certain, that there had been an animal different from the elephant, but furniſhed with the ſame tuſks, and that animal might have exiſted in Siberia.

Of the tame and wild animals, birds, fiſh, and inſects.

THE Ruſſians live upon very indifferent ſorts of food, eſpecially in the country from Moſco to Tobolſky, as may be ſeen in the account already given. There is however great plenty of all the neceſſaries of life throughout this extent of land, except bread and wine. The rivers abound with fiſh, and the country with all ſorts of game. The peaſants ſeldom eat butchers meat, and leſs frequently game; and ſeem to care very little about this kind of food. They live chiefly on fiſh, becauſe they can be ſupplied with it eaſily in large quantities. Fiſh is ſo plentiful, eſpecially in Siberia, that, inſtead of buying it from the fiſhermen, it is often the cuſtom to make bargains with them for the chance of a certain number of drafts. One may always get fiſh enough to keep a whole family for ſeveral days, for the value of four or five pence Engliſh. Game may alſo be had at a very low price; but the Ruſſians dreſs it badly, and in the moſt uncleanly manner. In other places, many people are enticed by the luxuries of the table; but a ſtranger in Ruſſia eats only to ſupport life.

The partridge is very common at Tobolſky, and all over Ruſſia, as well as the moor-cock, the wood-hen, and the quail; but all theſe birds have a diſagreeable fiſhy taſte. There are alſo infinite numbers of aquatic birds round about Tobolſky, and in all the northern parts of Siberia; but moſt of them, as well as the birds of prey, are met with in the reſt of Europe.

I brought away the following birds from the country about Tobolſky.

The ſea peacock.
The ſea pie.
The Swiſs lapwing.
The grey plover.
The leſſer godwit.
The greenſhank.

The

The wigeon.	The large aſh colored ſea gull.
The pin-tail duck.	The black and white gull.
The tufted duck.	The great curlew.
Gargany and teal.	The ſcoter.
The common mallard.	The diver.

All theſe birds have been deſcribed in other works, I have only taken notice of the two laſt, becauſe they differ in ſome reſpects from thoſe Mr. Briſſon has deſcribed in his treatiſe on birds.

The diver of Siberia ſeems to be the ſame as that Mr. Briſſon has deſcribed, under the name of the red neck diver *; (tom.

* *The red neck diver.*

It is rather larger than the tame duck; from the extremity of the bill to that of the tail, it is one foot, eleven inches, ſix lines long; and two feet, three inches, ſeven lines long, to the extremity of the nails; its bill, from the tip to the corners of the mouth, is two inches, ten lines long; its tail one inch, ten lines; its foot, two inches, eight lines; the middle one of the three anterior toes, together with the nail, is three inches, one line; the external toe, three inches, three lines; the internal one, two inches, eight lines, and the poſterior one, only eight lines. Its flight is three feet, eight lines; and its wings when cloſe, hardly reach beyond the root of the tail: the top of its head is covered with ſmall feathers brown in their middle part, and aſh-colored at their edges; all the reſt of the head, the throat and ſides of the neck, as far as about two thirds of its length, are aſh-colored: the occiput and the under part of the neck, as well as the ſides of it near the body, are covered with ſmall brown feathers, edged on both ſides with white; which makes them appear variegated with longitudinal ſpots, ſome white, others brown; the feathers, however, of the neck neareſt the back, inſtead of being bordered with white, are only marked on their edges with ſmall ſpots of this color; the back, the rump, and the upper parts of the tail, are of a ſhining brown color; the feathers on the ſhoulder are of the ſame color, ſome of them being marked with ſmall white ſpots. On the lower part of the neck, there is a ſpot of a beautiful cheſnut color *, four inches long, and about eighteen lines broad at its lower part: its figure is that of an Iſoſceles triangle, with its apex towards the throat. The lower part of the neck, beneath this ſpot, is covered with feathers of

* In the diver I brought with me, this ſpot is of a beautiful cheſnut color: but is not more than two inches ſix lines in length; its breadth, at the lower part, is fifteen lines, and at the upper part eight. Above this ſpot, the lower part of the neck is covered with ſmall feathers, brown in the middle, and edged all round with white: the breaſt, the belly, and the legs, are of a very fine ſilken white color, like that of the Didappers.

tom. vi. page 111. N° 111.) the deſcription here given of it is the ſame as that gentleman's. The differences I have obſerved will be mentioned in a note.

I have ranged the ſecond bird in the claſs of the ſea ducks; it as ſome analogy to the ſcoter † deſcribed by Mr. Briſſon, (tom.

of a brown color in the middle, and edged all round with white. The breaſt, the belly, and the legs, are of a beautiful white; the ſides are covered with brown feathers, moſt of which are edged with white; thoſe under the tail are alſo brown, and almoſt all tipped with white; the feathers underneath the wings are white; ſome of the largeſt of them, however, are rather aſh-colored on their outſide; the ſmall feathers on the tops of the wings, and the large ones, at the greateſt diſtance from the body, are of a ſhining brown color; the large and middling ſized feathers neareſt the body are of the ſame color, and marked on their edges with a few ſmall white ſpots; the wing is compoſed of thirty feathers of a dark and almoſt blackiſh color, but much lighter at their origins on the inſide only: the two neareſt the body are moreover marked with ſmall white ſpots, placed on their edges, near their extremities: the firſt feather is very ſhort; the ſecond the longeſt of all: the tail is compoſed of twenty brown feathers; the middle ones are rather longer than the ſide feathers; theſe continue decreaſing gradually in length to the outermoſt on each ſide, which is the ſhorteſt; ſo that the end of the tail is rounded: the bill is black; the feet, the toes, together with the membranes, and the nails, are blackiſh; but the inſide of the feet and toes is inclined to a reddiſh caſt. This diver is found in the northern ſeas, builds its neſt on little eminences met with in rivers, and lays but two eggs. *From Mr. de Reaumur's cabinet.*

† *The ſcoter.*

It is ſomewhat larger than the tame duck; from the extremity of its bill to that of its tail its length is one foot, eight inches, three lines; its bill, from the tip to the corner of the mouth, is two inches three lines long; its tail, three inches, three lines; its foot, two inches; the outward toe with the nail, three inches, the middle toe, two inches, eleven lines; the inward toe, two inches, two lines, and the hind toe, ten lines. Its wings, when cloſe, extend as far as the middle of the tail; their length from the pinion is ten inches; the head, the throat, the neck, and the breaſt, are of a deep black poliſhed color; the back, the rump, and the coverings of the upper part of the tail are of the ſame color, but neither ſo deep nor ſo ſhining; the ſides and the belly are blackiſh; the ſmall feathers underneath the wings are of the ſame color; the large ones are aſh-colored; the ſmall feathers on the outſide of the wings, as well as the large ones, are of the ſame black color as the back: the feathers of the wings are of the color of the back on their outſide; thoſe which are nearer the body are blackiſh on their inſide, and thoſe which are at the greateſt diſtance are aſh-colored: the feathers of the wings decreaſe in length in proportion as they are nearer the body.

tom. vi. pag. 420, N° 28.) of which you may be convinced by comparing my deſcription with his; which I have copied wherever there was any affinity between the two birds, in order that they may be better known.

Pelicans, ſwans, and ſome few didappers, are alſo found about Tobolſky. There is an infinite variety of ſea peacocks; as there are ſcarcely two of them to be found alike.

The rivers and lakes of Siberia, as well as thoſe of Ruſſia, contain almoſt all the ſame kinds of fiſh as are found in Europe, trouts, pikes, tench, breams and carp; but eels, craw-fiſh, the common ſalmon and ſmelts, are very ſcarce. All ſorts of ſturgeon are to be found here, and whitings, haddocks, and ſmall cods, are the moſt common of all.

The rivers of Siberia abound with many other kinds of fiſh unknown in Europe. Among theſe is the ſterlet, which is ſo very like the ſturgeon that there is ſcarce any difference, except that it is much ſmaller and much more delicate. It is ſo fat that it may be fried without oil. The fat of it is yellow, and is collected for the uſe of the kitchen. The people are very careful of its eggs, as well as of thoſe of the ſturgeon; they fry them a little in oil, with ſalt and ſpices of the country.

body. Underneath the flag part of the wing there is a tranſverſe white band, compoſed of twelve feathers ariſing from the bend of the wing; when the wings are cloſe, that part of this white band, which remains expoſed, is three inches long, and about eight or nine lines broad. Theſe white feathers cover the large ones. The bill forms a ſmall black eminence, on which the noſtrils are placed; at its upper part it is one inch, ſix lines long, from the tip to the feathers, and eleven lines to the part where the eminence begins *: the breadth of the bill is one inch, and it is of a brimſtone color; two black ſtreaks are ſeen on both ſides of the noſtrils; they diverge towards a round part which is bent on the lower bill: the bill is denticulated, like that of the common duck. This ſcoter is found in the marſhes round about Tobolſky in Siberia. *From the collection of the Marchioneſs of Aligni.*

* This eminence has not the leaſt analogy to the tubercle in the ſcoter deſcribed by Mr. Briſſon.

Theſe

Theſe eggs, dreſſed in this manner, are known by the name of caviar, which is put up in pots like muſtard; this food is as much eſteemed as the ſterlet.

This fiſh and ſturgeon are very common at Tobolſky, and conſequently the caviar alſo; but this laſt kind of food, and the ſterlet, are very dear throughout the reſt of Ruſſia. At Tobolſky, a ſterlet, two feet long, ſells ſometimes for no more than ſixpence Engliſh. All other fiſh are exceedingly cheap there, as they are in general all over Ruſſia.

The tame animals fed at Tobolſky, and from thence to St. Peterſburg, are oxen, horſes, ſome ſheep, dogs, fowls, geeſe, and ducks in great plenty.

The oxen * are of a very ſmall breed, as well as the horſes; theſe laſt animals run with great ſwiftneſs, and are almoſt indefatigable: they run through a poſt of twenty leagues with the greateſt eaſe and without any inconvenience.

There are ſcarce any oxen or horſes to be found beyond Tobolſky; the method of travelling there is with dogs harneſſed to the ſledges.

The wild animals are black and white bears: the firſt are very common, the laſt are found on the borders of the Frozen Sea. There are common wolves in all the foreſts, as well as lynxes, boars, elks, a kind of ſtag very like the fallow deer, and foxes, which, although of the ſame ſpecies, are ſtill very different with reſpect to the color of their ſkin; ſome being perfectly white, others yellow inclining to red. Some are grey, with a black ſtreak on the back; theſe are much valued: the moſt ſcarce and moſt beautiful are perfectly black. The ſkin of one of theſe ſometimes ſells for three or four hundred roubles or two thouſand livres of France. They are commonly found towards the eaſtern part of Siberia; in the way from

* The oxen of the Ukraine are very large.

Tobolſky

†

Tobolſky to Kamtſchatka. Ermines and ſables are alſo moſt common in the ſame places: the fine ſables are extremely dear, as the lining of a man's ſuit of cloaths ſells for five or ſix thouſand livres, and ſometimes twenty; although I myſelf never ſaw any furrs of this price in Ruſſia. In France, the tails of the martins are much valued: in Siberia, this part of the ſkin of the animal is the leaſt in repute; becauſe the hair of it is too harſh: the moſt beautiful martins indeed have ſeldom fine tails; they are perfectly black, or have but few grey hairs: the back is the part moſt valued, ſo that furriers, who chuſe to be ſupplied with fine furrs, cut up all theſe ſkins, and ſew the backs together, in order to match them; this makes the kind of furr that is ſo very dear. Beſides that, the ſkins of ſables are thicker of hair than thoſe of the martins of other countries; the ſhag is alſo longer, ſofter, and the furrs that are made of it are much lighter.

The gulo, or glutton, is alſo found in Siberia, in the diſtrict of Hinſk; as well as otters, beavers, the iſatis, or fox of Siberia, rein-deer, and the ſayga, a kind of wild goat, which is chiefly found, as well as the otters and beavers, in the ſouthern part of Siberia, near the origins of the rivers Irtyſz, Jeniſſea, and the Oby. The otters, beavers, and the rein-deer, are more common at Kamtſchatka, they are not to be found in the reſt of Siberia, except in the eaſtern parts.

The inhabitants collect themſelves in companies to go a hunting theſe animals; they go at the cloſe of the winter, from the month of March to the end of April, taking proviſions with them for ſeveral days. I have been aſſured that they ſometimes go in rackets, as I have mentioned before, but I never ſaw this done in Siberia, ſo that it does not appear to be commonly the cuſtom. They catch the ſmall animals with ſpringes and nets, and the large ones with traps.

They cloath themſelves with the moſt common furrs, chiefly with ſheep ſkins: they ſell the others to pay their taxes and their lords.

The furrs of Jeniſſeik are more valued than thoſe of the Oby and the Lena. I have only mentioned the names of all theſe animals here, as they are perfectly well deſcribed in the natural hiſtory of the king's cabinet by Meſſrs. Buffon and Daubenton.

Partridges and hares are white in the winter, and ſquirrels grey. Theſe animals regain their natural color in ſummer; the partridges while they are moulting, and the quadrupeds by ſhedding their coats. Although the ſame phoenomenon be obſerved in ſome other countries, I was ſo ſtruck with it in Ruſſia, that I reſolved to examine whether it was to be accounted for from the nature of the climate or the ſpecies of theſe animals. I found no difference between the hares of Ruſſia and thoſe of France to outward appearance, except that the ſkins of the firſt are thicker of hair. They have alſo underneath their paws a kind of down, like that of ſwans; but there is no hair underneath the paws of hares in our temperate climate.

If the exceſſive cold in Ruſſia was really the cauſe of the white color in theſe animals, they ought not to grow white when fed in a ſtove during the winter time. I fed a hare in the ſummer time at Tobolſky, intending to make this experiment, which I could not ſucceed in, becauſe my hare died before I left Tobolſky; but paſſing through Moſco, at my return from Siberia, I ſaw a lady who had a tame ſquirrel, which was already turned grey at the end of October, though it was always kept in a very hot ſtove. I do not think the point can be determined from this one fact; which is, however, ſufficient to throw doubts upon the opinions of thoſe, who imagine that the whiteneſs of hares and partridges is a conſequence of the exceſſive cold

cold theſe creatures are expoſed to in Ruſſia; they ſeem rather to be of a different ſpecies from thoſe of our climates.

The inſects of Siberia and Ruſſia are very little known. Notwithſtanding the pains I took to acquire ſome knowledge of them, yet I am ſcarce able to give any freſh information to naturaliſts on this ſubject.

The variety of objects I was engaged in throughout my journey, did not allow me, as I was alone, to collect inſects myſelf, becauſe I could not ſtay long enough in the country. I was in hopes to have met with ſome aſſiſtance in the places where I ſtopped, by promiſing rewards to all perſons who would ſupply me with inſects; but yet I had not one brought to me. I can, however, venture to ſay in general, that moſt of the inſects of Ruſſia are of the ſame ſpecies as thoſe which are found in marſhes and ponds; they commonly appear in Siberia about the month of July.

There are ſuch numbers of large gnats, eſpecially at Tobolſky, that they are very troubleſome to the inhabitants, even in their own apartments. As I was unacquainted with this inconvenience, I took no care at firſt to guard myſelf againſt theſe flies, ſo that I could not be one moment at eaſe from the itching occaſioned by their bites: my legs, my face, and hands, were ſo conſiderably ſwelled, that I was obliged to keep my bed for ſeveral days. I did not venture out afterwards without boots, covering my face with a veil, and putting gloves on, according to the cuſtom of the country. Soldiers who ſtood centry took the ſame precautions; and I have ſeen ſome of them cover their faces with pitch. As I was obliged to have my face uncovered, in order to make my aſtronomical obſervations, I had a fire made with peat round my obſervatory, ſo as to raiſe a conſiderable ſmoke; this made the inſects diſappear, and when I was going to take my obſervation I had the fire put out again.

The large gnats are not the only inſects with which the inhabitants of Tobolſky are incommoded; the air being alſo full of ſmall gnats, they form clouds, which are always in motion, and are continually ſticking againſt one's face, but are more troubleſome than hurtful.

Clouds of locuſts and dragon-flies appear ſometimes in theſe regions. I have been aſſured, that, in the years 1749, 1750, and 1751, there were ſuch multitudes of locuſts in Ukraine, that they deſtroyed all the corn round about Bielgorod, as well as all the vegetables and the leaves of the trees: and there appeared at Tobolſky, on the ſecond of July 1761, ſuch a great number of dragon flies, that the noiſe they made, tempted me to go out of my room in order to find out the cauſe of it. From the obſervations I made, it appeared that theſe inſects formed a column, extending from the river Irtyſz to my obſervatory; it was therefore about 500 toiſes long: the height of the column was not above five toiſes. It made its firſt appearance about eight o'clock in the morning, and continued paſſing till one in the afternoon, following the banks of the river in its courſe from north to ſouth. Theſe inſects flew with inexpreſſible ſwiftneſs. In order to have ſome idea of this, I fixed my eyes upon one cloud of theſe flies, with a watch in my hand, which marked the ſeconds, and began to run as faſt as poſſible, attempting to follow it; in nine or ten ſeconds I perceived the cloud began to get beyond me. I then meaſured the ground I had gone over, and found that it covered between 19 and 20 toiſes. I convinced myſelf, by ſeveral repeated experiments, that this column of inſects moved at the rate of 20 toiſes in nine ſeconds, and conſequently fourſcore thouſand toiſes, or three leagues and a half in an hour; ſo that as the column had been five hours in paſſing, it muſt at leaſt have occupied a ſpace of ſeventeen leagues in length: I have made it appear, that the column was alſo five toiſes in breadth, and

five

five in height; it muſt therefore have contained an infinite number of inſects. They appeared at firſt under the form of a cloud, which ſeemed to graze the earth, ſo that we were afraid to come near it; and when once got into it, our faces were ſtruck every inſtant with the quantity of theſe flies, which were perfectly ſimilar to thoſe we have in France.

From all that has been ſaid it appears, that game and fiſh are found in Siberia, and that butchers meat is common in ſome places; but that corn does not grow kindly in this province. It is brought hither from parts of Ruſſia ſituated in Europe. Monopoly makes it dearer in Siberia, on account of the frauds which prevail there, in ſpite of the watchfulneſs of the governors; ſo that the people ſeldom eat any bread.

The Ruſſians, indeed, in general know not how to make bread: in Siberia, they do not ſeparate the bran from the flower; their bread is neither leavened nor baked, ſo that if one throws a bit of it againſt the wall, it ſticks there like plaiſter; it is ſour and black. There was no other kind of bread in uſe at Tobolsky all the while I was there, except at the archbiſhop's. The bread is ſo bad, that thoſe who were along with me determined not to eat any of it, till all the biſcuit I brought with me from St. Peterſburg, which I intended to keep for my return, was conſumed.

The archbiſhop has his flower ſifted, and has ſmall loaves made of it, two or three inches in diameter; he was ſo obliging as to ſend me now and then a dozen of them, which was a very conſiderable preſent: he ſent ſome alſo to the governor on feaſt-days; they were cut into ſmall ſlices, one of which was given to each gueſt.

Wine is known at Tobolsky by report only: the perſons who go from St. Peterſburg or Moſco into Siberia ſometimes take a few bottles with them; but travellers are generally leſs anxious about providing themſelves with wine for theſe journies,

on account of their being obliged to ſupply themſelves with every other neceſſary of life. The liquors in uſe at Tobolſky are the ſame as thoſe I have already mentioned in ſeveral parts of this work. The common people drink quouas, and the other inhabitants drink beer, mead, and other liquors made with brandy.

A conſiderable revenue ariſes to the ſovereign from brandy, which is made only from corn, all over Ruſſia. The people, who undertake this contract, ſell a tun of brandy to the crown for thirty roubles *, or a hundred and fifty livres of France; and the crown ſells it again to the public at 90 roubles, or 450 livres of France. All the Ruſſians are forbidden to make brandy, on pain of the moſt ſevere puniſhments. The nobility alone are permitted to provide themſelves with ſome for their own uſe.

* The tun contains 480 French quarts; and I have been aſſured that 24 of theſe diſtilled, produce about two quarts of ſpirit of wine.

Of

Of the climate of Siberia, and the other provinces of Ruſſia.

THE vaſt empire of Ruſſia extends about nineteen hundred leagues * from weſt to eaſt, that is, from the iſland Dago to Cape Tchuktſchi, which bounds it to the eaſt †. About fourteen hundred and ſeventy of theſe leagues are taken up by Siberia alone, and the remaining four hundred and thirty make up the reſt of Ruſſia. The breadth of the latter part, from Azoph to its boundaries in the Frozen Ocean ‡, is five hundred and twenty-five leagues. The greateſt breadth of Siberia, from its ſouthern boundaries towards Selinginſki §, is near ſeven hundred leagues ¶.

I was told, in paſſing through Solikamſky **, a city ſituated in the weſtern limits of Siberia, that in the year 1761, Mr. de L'Iſle's thermometer had ſunk down to two hundred and eighty degrees, which anſwers to about ſeventy of M. de Reaumur's. This extreme and almoſt incredible degree of cold appeared the more aſtoniſhing to me, as the thermometer, on which it was obſerved, was expoſed on a wall

* One degree contains five and twenty of theſe leagues, or 2282 toiſes, ſuppoſing the mean degree of the meridian to be fifty-ſeven thouſand and ſixty toiſes.

† The longitude of the iſland of Dago is about forty degrees, and that of Cape Tchuktſchi, two hundred and nine.

‡ Azoph is at the forty-ſeventh degree of latitude, and the limits of the north about the ſixty-eighth degree.

§ The limits of the ſouth are at about forty-nine degrees of latitude, and extend as far as ſeventy-ſeven degrees.

¶ Theſe are the greateſt dimenſions. The mean length of Ruſſia, as far as Siberia, is about three hundred and fifty leagues; its mean breadth four hundred. The mean length of Siberia may be reckoned fourteen hundred and ſeventy leagues, its mean breadth, five hundred.

** Longitude, ſeventy-four degrees four and twenty minutes; latitude, fifty-nine degrees, thirty-five minutes.

to the north, in an open yard, ſo that I did not conceive it was poſſible a man ſhould live in the degree of cold he muſt neceſſarily be expoſed to, in croſſing the yard to take the obſervation; and I was ſtill confirmed in this opinion, by what I had myſelf experienced from the cold in Ruſſia. I had often feared not being able to ſupport it, though M. de Reaumur's thermometer fell only to about two and twenty degrees. My breath was then uſed to freeze about my lips, and to make one entire icicle with my beard, which I had ſhaved only once ſince my leaving Moſco, at Niſan-Novogorod, where I had made ſome ſtay. The reſt of my body, indeed, was guarded by the quantity of furrs I was covered with, beſides that the very ſnow which fell, would ſometimes defend me, as it lay five or ſix inches deep about my ſledge; yet the air I breathed, preſſed with ſuch force upon my breaſt, which had never been affected before, that I was like to ſink under the acuteneſs of the continual pain. This induced me to ſuſpect the validity of what I had been told about the ſeventy degrees of cold: beſides, that mercury condenſed in a thermometer, to a certain degree, requires a far more intenſe cold to keep up its condenſation; ſo that ſuppoſing the cold of Solikamſky four times more ſevere than what I had been expoſed to, although ſuch a degree of cold muſt have been exceſſive, and ſcarce poſſible to be conceived, yet it would ſtill have been much leſs intenſe, than what the inhabitants of the place muſt have really felt.

Being deſirous of gaining every poſſible light on this extraordinary fact, I went to ſee the thermometer the Ruſſian had made uſe of; it was fixed on a plate of copper divided with the greateſt nicety; and the height of it, aſcertained for that day, according to the known rules, agreed exactly with my thermometer, made with the greateſt accuracy on M. de Reaumur's principles; ſo that I could no longer be in any doubt about the goodneſs of the inſtrument. I called therefore for the

diary of obſervations made throughout the whole year, and from examining the progreſſion of the thermometer, received the moſt ſatisfactory evidence of the truth of this aſtoniſhing fact. To ſuch extreme cold, the frequent accidents, which happen to travellers in Siberia, are certainly to be attributed. I was aſſured at Solikamsky, that the cold ſometimes increaſed ſo conſiderably in a few hours, as to ſtrike both men and horſes dead, who happened to be at too great a diſtance from any houſe to ſhelter themſelves ſpeedily from it.

In common cold weather, it frequently happens, that ſome parts only of the body are frozen; in this caſe, it is uſual to rub them with ſnow, by which the circulation is immediately reſtored. When ſuch an accident happens to the face, which generally loſes all ſenſation in theſe exceſſive froſts, the perſon affected in this manner muſt be told of it; for without this eſſential piece of ſervice, which people do each other by turns, the frozen part would ſoon be loſt.

The climate of Tobolsky is very cold. In the year 1735, M. de Reaumur's thermometer was obſerved to be at 30 degrees in this city *; it appears, however, that the winters are leſs ſevere there than at Solikamsky. Although the winter of 1761 was very rigorous in this capital of Siberia, it by no means came up to what was felt at Solikamsky.

The ſoil of the country about Tobolsky is very fit for agriculture; a layer of black earth from one to two feet deep, being every where to be met with. This earth is ſo fat as to make clay uſeleſs; and ſo light as to be ploughed eaſily with one horſe. Notwithſtanding all theſe circumſtances, ſo favorable to the cultivation of land, this is ſtill extremely neglected, owing as much to the lazineſs of the inhabitants, as to the ſeverity of the cold, the length of the winters, and the

* M. De Liſle, vol. acad. 1749, pag. 2. des mémoires.

almoſt continual rains which follow the thaw. Theſe are the ſeveral cauſes, on account of which, the little corn that is ſown ſeldom comes to perfection.

In our more temperate climates, at the beginning of May, nature ſeems to revive, and to impart new life to all that breathes or vegetates; the trees are adorned with freſh leaves, and the face of the whole country with an agreeable verdure, the different ſhades of which form a variety of pleaſing landſcapes. The birds have already choſen their mates, begin to enliven nature with ſport and ſong, and fill every hedge or green tree with ſounds of joy. The lark ſeems to give the ſignal of the riſing morn; now he ſoars above the clouds, making the air ring with his warbling notes, and now, in an inſtant lights on beds of flowers, with which the meadows and fields are enamelled. All nature is beautified, and inſpires cheerfulneſs and pleaſure in our climates, while dreadful winter ſtill reigns at Tobolſky. Inſtead of that verdure, and thoſe flowers whoſe fragrance is ſcattered far around; the continued melting of the ſnows, forms and keeps up torrents in the mountains, ſome of which ruſh into the neighbouring rivers, ſwell them, and overflow the country; others roll over the immenſe plain beneath, ploughing it up in all directions, and ſpreading confuſion and deſtruction all around. Then the plain, viewed from ſome neighbouring hill, appears like a new ſea, formed, on a ſudden, in the midſt of a continent. The ſky is then almoſt always darkened by clouds, whoſe vapours frequently fall down in rain, ſometimes in ſnow or frozen miſts, which are the more alarming, as they are always driven by impetuous winds, and therefore occaſion more acute pains than are felt from a much greater degree of cold. This ſeaſon of the year uſually paſſes in this alternation of rain, ſnow, and miſts. On the 4th of June, the whole country was three times covered with ſnow, which diſappeared as often; ſoon after, the air became

more

more temperate by the approach of the ſun to the ſolſtice; this luminary, at that time of the year, is almoſt always upon the horizon, ſo that one may read with the utmoſt eaſe at midnight. Although the heat laſts but for a ſhort time, yet even in this interval the vegetables ſuddenly ſhoot up. The corn was already a foot high on the 22d of June; but inſtead of the fruit-trees, which grow in almoſt all other places, nothing is to be ſeen in theſe nearly deſert countries, except fir-trees, appearing as old as the earth itſelf: their form, which is ever the ſame, and the gloomineſs of their color, ſaddens the moſt cheerful diſpoſition. In theſe ſolitary woods, the only perſons to be met with, are ſome of the unfortunate inhabitants of theſe climates, in ſearch of birch-trees, into which they make an inciſion, in order to collect the ſap, from whence their mead is afterwards prepared.

I have often walked along the banks of the river Irtyſz, at the diſtance of ſeveral leagues from Tobolsky, in hopes of ſeeing landſcapes embelliſhed with a multitudes of houſes; inſtead of which, I met with nothing all along this river, but a vaſt plain, covered by the mud the waters had depoſited before they ſubſided; and pools of ſtagnated water on all ſides, whoſe borders were ſtrewed with dead boughs, and trunks of trees which had been rooted up. Although it was near the end of July, the ground had not yet acquired firmneſs enough to make the treading it entirely ſafe. Spurred on by the deſire of getting ſome birds I was unacquainted with, I ventured to ſtop a few minutes in the ſame ſpot; but, being too intent upon my object, did not perceive the ground had given way, till after I had ſhot one of the birds; I then attempted to fetch it, but found myſelf ſtuck ſo faſt, as not to be able to ſtir. At laſt I got out of this place, by ſupporting myſelf with my gun, but gave up my bird, and was not tempted to go in ſearch of others. I got back to the boat in which I had come down the

river, and did not quit it again till I came to the firſt village, ſituated on pretty high ground. Every thing in this village beſpoke the utmoſt miſery. I walked round about it, and found ſome corn had been ſown there, which was as fine as one could wiſh to ſee it, but ſo backward for the ſeaſon, that the inhabitants deſpaired of there being time enough for it to ripen.

No European fruit is to be found at Tobolsky, except the currant, which is ſometimes met with in the woods. The fruits of the country are the glouguat, and a kind of raſberry. The glouguat bears a great reſemblance to our currants. Theſe fruits have a little tartneſs and are looked upon as antiſcorbutics. The people are alſo very careful in gathering the fruit of a kind of pine, very like the cedar. There are indeed but few of them growing in the neighbourhood of Tobolsky itſelf, but they are found in plenty about Verchaturia. The fruit of this tree is in great requeſt; it is eaten raw; and beſides this, an oil is extracted from it for the common purpoſes of the table.

It has been attempted in vain to ſow vegetables at Tobolsky. Radiſhes, a few ſallads, and a kind of green curled cabbage are almoſt the only ones which have ſucceeded; but the inhabitants have rhubarb of the ſecond ſpecies in their gardens, the leaves of which they make ſallads of, as they do of dandelion and nettles, when they begin to ſprout.

A Ruſſian had brought a young apple-tree with him from Moſco, which he had raiſed in a hot-houſe; this year (1761) it bore an apple about the ſize of a crab. It was produced in a large diſh at a grand entertainment, cut into ſmall ſlices, and given to ſome of the gueſts; among the reſt, one piece was offered to me, but I found it ſo ſour and ſo bad, that I could never bring myſelf to chew it, and was therefore obliged to

ſwallow

ſwallow it whole like a pill, that I might not appear wanting in civility.

The paſture is excellent, the graſs grows every where equally well; conſequently, the inhabitants have a great deal of cattle. I had read in ſome book of travels, that, during the whole ſummer, the ground at Tobolſky was never thawed more than a few feet below the ſurface, and an inhabitant of the city had alſo aſſured me of the fact; notwithſtanding which my daily obſervations made me ſuſpect the veracity of the Ruſſian, as well as that of the author. I frequently endeavoured to get the ground digged: the difficulty of having labourers in a country where all are ſlaves, made me reſolve to apply to the governor: he was ſo kind as to give me up a dozen criminals, who were chained and condemned to labour at the public works, like the galley-ſlaves with us. I had the ground digged by them ten feet deep and found it not frozen. I had intended going ſtill deeper, but having increaſed the pay of theſe unfortunate wretches, which was only one halfpenny Engliſh a day, they ſent for large quantities of brandy, made the guard drunk, and eſcaped while they were aſleep. I found their irons in the woods a few days after, but the governor not having thought proper to truſt me with any more criminals, I was obliged to give up the work. They had already gone four feet deeper without finding the earth frozen. I then thruſt my ſword in it (for I travelled in a lay habit) up to the hilt with the utmoſt eaſe. It is very certain therefore, that the ground at Tobolſky thaws entirely, ſince the thaw prevails as far as ſixteen feet deep. This experiment altered the idea I had conceived of the climate of Tobolſky, and made me ſtill more cautious of advancing facts from tradition and hearſay; for I am perſuaded the numerous miſtakes found in the writings of ſome travellers, proceed rather from their credulity, than from their want of truth.

Not having travelled beyond Tobolsky, I cannot ſpeak of the remaining part of Siberia from my own remarks. But modern travellers, having gone through this country with thermometers, and with a ſpirit of obſervation, far beyond that of their predeceſſors, have been enabled to communicate a very accurate deſcription of the climate of this vaſt country, which it is neceſſary to give an account of in this work.

According to Mr. Gmelin's obſervations *, made at Argunskoi in Siberia †, the climate is ſo cold in all this country, that many places are found where the ground never thaws more than three feet deep. People who work in the ſilver mines, in the neighbourhood, have made cellars in the parts which have been already digged up, to preſerve their proviſions from the ſevere cold felt at Argunskoi even in the ſummer. Nevertheleſs the air is ſo cold in theſe cellars, that the ice, which is formed there in winter, does not melt in the ſummer, although the thermometer was a little above the congealing point on the 17th of July, 1735.

The ſame traveller felt the greateſt cold of Siberia, for the firſt time, in the city of Jeniſſeik ‡, towards the middle of December. "The air ſeemed frozen, and like a miſt, "though free from clouds. This extreme condenſation of the "air hindered the ſmoke of the chimnies from riſing; the "ſparrows and magpies uſed to fall down and die of cold, "if they were not inſtantly taken up and carried into warm "places. When the door of a room was opened, a miſt was "immediately formed round the ſtove, and, within the four

* Gmelin, voyage en Siberie, edition Françoiſe, tom. i. pag. 252 and 258.

† Latitude, fifty degrees, fifty-three minutes; longitude, one hundred and thirty-ſix degrees, forty-two minutes.

‡ Latitude, fifty-eight degrees, twenty-ſeven minutes; longitude, one hundred and ten degrees, forty minutes.

"and

" and twenty hours, the windows were entirely covered with " ice, three-tenths of an inch thick *."

Mr. Gmelin went through the ſame city again on his return to St. Peterſburg in 1739 †, and made ſeveral obſervations there, to aſcertain whether the cold was equally ſevere. " On " the 22d of October, at midnight, Mr. de Liſle's thermo- " meter ſupported itſelf at one hundred and ninety degrees, " which anſwer to twenty-one degrees below the freezing " point in M. de Reaumur's. Mr. de Liſle's thermometer fell " towards the end of January at Jeniſſeik, to two hundred " and fifteen degrees, which anſwer to thirty-eight of M. de " Reaumur's. From that time the froſt gave way. The " river of Jeniſſea thawed on the 8th of April, and in three " weeks the country reſumed its verdure. This is a plain " proof that winters differ from each other here, as well as " any where elſe.

" According to the ſame traveller ‡, the cold began to be " felt at Olekminskoi §, in the year 1736, towards the end " of Auguſt; the trees loſt their leaves on the firſt days of " September; all the graſs was withered, ſome ſnow fell, and " the cold formed a frozen ſleet. On the 9th of September, " the ice began to float on the river Lena, and a few days " after, large pieces were taken out of it, more than two feet " thick, which the inhabitants turned to a very proper uſe. " Their windows do not ſhut cloſe, nor can the uſual preſerva- " tives of skins and dung defend either the rooms or cellars from " the intenſe cold. It is cuſtomary, therefore, to take large " clear pieces of ice, about the ſize of the window, which are

* Gmelin, tom. ii. pag. 181 and 182.

† Gmelin, tom. ii. pag. 51.

‡ Tom. i. pag. 352 and 355.

§ Latitude, ſixty degrees, twenty minutes; longitude, one hundred and thirty-ſeven degrees.

" placed

" placed on the outside; a little water is then poured on " them, and the window is made.

" The cold is so sharp at Jakutsk *, that, a few years be- " fore 1736, a waywode, who was obliged to go from his " own house to the chancellor's office, not more than about " eighty steps off, had his feet, hands, and nose frozen, and " did not recover without the greatest difficulty; although " his body was covered with a very large furr, and his head " wrapped up in a furr-hood †. Towards the end of June, " the ground is often found frozen for three feet deep. In " 1685, as the people were digging for a well, the ground " was found frozen thirteen toises deep in the month of " July ‡; yet the river thawed on the 11th of May 1737, and " on the 14th the frost was quite gone.

" The city of Tomsk, although situated much more to the " south §, is still exposed to very sharp frost. In the midst " of April, the air was already warm and agreeable; but it " changed on a sudden towards the 15th of May; we then " had snow, rain and sleet; and felt one day of cold unknown " before at this season ‖."

The city of Mangasea, situated on the river Jenissea, is in a very cold climate ¶. Mr. Gmelin speaks thus of it **. " I have mentioned the fine days we had, before we left " Jenisseik, towards the end of May ††. When we arrived

* Latitude, sixty-two degrees; longitude, one hundred forty-five degrees, forty-two minutes.

† Tom. i. pag. 381, 411, and 412.

‡ I imagine this to be an error of the press, and that it should be thirteen feet.

§ Latitude, fifty-seven degrees, three minutes; longitude, one hundred and two degrees, thirty-eight minutes.

‖ Gmelin, tom. ii. pag. 164.

¶ Latitude, sixy-five degrees, thirty-six minutes; longitude, one hundred and seven degrees.

** Tom. ii. pag. 54.

†† Tom. ii. pag. 51.

at

" at Mangaſea, we thought we had paſſed from ſummer to " winter, although it was on the 10th of June: we were then " indeed at 65 degrees, 36 minutes, north latitude. The " ground was covered with ſnow, which ſtill continued falling; " the ice was extremely thick, and did not melt even in the " day-time. This bad weather ſoon ceaſed, and we were not a " little ſurprized at the ſudden change we were witneſſes of. " As ſoon as the air had acquired ſome degree of heat, it " preſerved it; the vapours and clouds, which had darkened " the face of the heavens, diſappeared at once, and, ſo ſoon " as the 12th, we were able to live without fire. The next " day we ſaw ſome ſwallows. The heat of the ſun increaſed: " on the 11th, there was no ſnow to be ſeen, the graſs grew " viſibly; ſo much, that if ever man could be ſaid to ſee it " grow, it was at Mangaſea."

M. Deliſle, of the Royal Academy of Sciences, in the long ſtay he made at St. Peterſburg, has collected all the obſervations, made in Siberia, by the different academicians ſent into Ruſſia: he has alſo lived among moſt of them at their return, and from them has received all the informations he could deſire. The account he gives of the cold in Siberia is too intereſting to be omitted *. He has likewiſe made a table of his obſervations, from which an accurate idea may be formed of the almoſt incredible froſts of Siberia, and of thoſe which prevail throughout the reſt of Ruſſia.

It appears from this table, that, in 1735, the cold made Mr. Reaumur's thermometer fall down to ſeventy degrees at Jeniſſeik, as it has been already obſerved it did at Solikamſky in the winter of 1761. In the ſame year 1735, the cold was much leſs intenſe at Tomſk, ſince it anſwered only to fifty-

* Vol. de l'Acad. Roy. des Sciences de Paris, an. 1749, pag. 1. des mémoires.

four degrees and a half of M. Reaumur's thermometer. At Irkutſk *, it was at thirty-two degrees, although this city is ſituated in one of the moſt ſouthern provinces of Siberia; and at Tobolsky at thirty degrees, notwithſtanding this city ſtands about ſix degrees northward of Irkutsk †.

It happens not unfrequently, even on the borders of China, that ſo great a degree of cold is felt, as to make M. Reaumur's thermometer fall to thirty degrees; and the places where this has happened, are nearly in the parallel of Paris, where the greateſt cold, in 1709, was fifteen degrees, and one quarter.

The obſervations made on the cold at Aſtracan, mention facts as extraordinary as any of thoſe I have been relating. Aſtracan, though ſituated under the parallel of the middle of France ‡, is ſtill expoſed to the moſt ſevere cold, even ſuch as is felt in moſt northern parts of Europe. According to Mr. Lerch's obſervations §, the river Volga froze on the 14th of December 1745; the cold increaſed daily, and Mr. Deliſle's thermometer fell, on the 27th of the ſame month, to one hundred and eighty-four degrees; which anſwer to ſixteen degrees of Mr. Reaumur's. In the beginning of January 1746, the cold at Aſtracan anſwered to twelve degrees of Mr. Reaumur's thermometer: it increaſed every day to the 16th. Mr. Deliſle's thermometer was at one hundred ninety five degrees and a half, which anſwer to four and twenty degrees and a half of M. Reaumur's; and while this very ſevere weather was felt at Aſtracan, the winter was exceeding mild in the northern parts of Europe.

* Latitude, fifty two degrees, eighteen minutes; longitude, one hundred twenty-two degrees, thirty-eight minutes.

† Latitude, fifty-eight degrees, twelve minutes, twenty-two ſeconds; longitude, eighty-five degrees, fifty-ſix minutes, forty ſeconds.

‡ Latitude, forty-ſix degrees, fifteen minutes; longitude, ſixty-eight degrees, twelve minutes.

§ Volume de l'Académie de Berlin; année 1746, pag. 257.

When

When we come to ſpeak of the cold felt in the other parts of Ruſſia, after what has been ſaid of Siberia, the climate appears very different, altho' ſtill extremely cold. It grows more temperate as one comes nearer to the weſtern boundaries of Ruſſia. From Mr. Deliſle's table it appears, that the cold at St. Peterſburg * makes Mr. Reaumur's thermometer fall from ſeventeen to thirty degrees: I have not met with any obſervations made at Moſco, but it is generally enough known, that the cold is ſo ſevere there, though it ſtands much more to the ſouth than St. Peterſburg †, that in ſome winters the inhabitants can hardly bear it. If water is thrown up into the air, it often falls down again in ice. The winter in theſe two laſt mentioned cities, uſually continues for ſeven or eight months, and ſometimes longer. The climate grows more temperate as one draws nearer to the ſouth; in the Ukraine it is very mild.

Notwithſtanding the degree of cold I have mentioned, corn grows in many of theſe places. The ground in general is very fit for agriculture in ſome part of Siberia; where a black kind of earth is met with, like that of Tobolſky, and conſequently exceedingly fertile; ſo that if the ſoil does not every where produce corn, it is for want of a ſufficient heat to bring about the vegetation of plants.

The province of Nerczinſk is very fruitful, and more ſo than any other part of Siberia: here the corn comes to its full perfection, and all kinds of fruits are produced: this fact is authenticated by all the travellers.

Although the ground never thaws at Argunskoi below a certain depth, yet a kind of wild buck-wheat grows there,

* Latitude, fifty-nine degrees, fifty-ſix minutes; longitude, forty-ſeven degrees, fifty-three minutes.

† Latitude, fifty-five degrees, forty-ſix minutes; longitude, fifty five degrees, ſeven minutes.

which differs from the common ſort in being leſs, and not angular *.

Corn thrives pretty well between the forts Olekminſkoi and Vitimſkoi, notwithſtanding the extreme cold felt there †. On the 10th of Auguſt 1736, the hay was got up at Vitimſkoi: moſt of the corn was reaped; and in kindly years the harveſt is never later, although ſome cold nights had already been felt.

The frozen ſoil of the province of Jeniſſeik, and the lazineſs of the inhabitants, are equally the cauſes of this province being almoſt uncultivated though it is one of the moſt extenſive.

The province of Irkutſk is of a great extent; it is uncultivated and barren; full of deſert and dry plains, over which one may travel for ſeveral days without meeting with one ſingle tree. There are many ſalt lakes in this province.

The climate of Jakutſk is by no means fit for corn, altho' barley has ſometimes been ſeen to grow and ripen there; but as it has failed ſeveral times, the ſowing of it has been long ſince neglected. The other kinds of corn have never been known to ripen. This diſtrict is not only too far north, but likewiſe too much to the eaſt. The earth, however, is black and greaſy, as in the beſt ſoil of Siberia ‡.

All the other parts of Siberia, from the town of Ilimſk to the ſea of Kamtſchatka, are barren, dry and deſert §. The inhabitants of theſe laſt regions live contentedly without bread: their food conſiſting of vegetables, fiſh, and game; and the pulp of young pines, which they ſcrape off, dry it, reduce it to powder, and afterwards mix it with their victuals ‖. Corn, however, is imported into theſe parts of Siberia, but in very

* Gmelin, tom. i. pag. 259.
† Gmelin, tom. i. pag. 338. and 349.
‡ Gmelin, tom. i. pag. 411.
§ Deſcription de l'Empire de Ruſſia, par M. le Baron de Strahlenberg, tom. i. pag. 28.
‖ Gmelin, tom. i. p. 388.

ſmall

ſmall quantities, on account of the length of the roads, and the difficulty of feeding the horſes.

According to Mr. Gmelin *, there is no paſture to be found about the town of Okotſkoi; nothing grows there but ſmall willows, the young ſhoots of which can be eat by the horſes. It often happens, that in going from this town † to Jakouſk, where the horſes muſt be brought back, the winter ſets in while the people are on the road; in which caſe moſt of the horſes periſh, ſo that it is ſcarce poſſible to ſave one out of a hundred.

The regions of the ſouth part of Siberia, towards the borders, produce no corn, or very little, as far as the confines of Aſtracan. This, however, appears to be the only part of Siberia fit for human beings to live in: the climate is mild, and the ſoil ſeems as if it would be very fertile, if cultivated; but for want of inhabitants, nothing beſides deſerts are to be met with, which form a powerful barrier againſt the Tartars. The cold is ſometimes very ſevere there as I have before obſerved: but this is to be looked upon as an extraordinary circumſtance, not reſulting from a general law.

The reſt of the Ruſſian empire is cultivated in ſeveral places; its mean length, from weſt to eaſt, is about three hundred and fifty leagues, and four hundred from ſouth to north. It is not equally peopled throughout, nor equally fit for agriculture. All the country between the Frozen Sea and the parallel of St. Peterſburg, ſituated about the ſixtieth degree of latitude, is hardly peopled at all: nothing but foreſts and marſhes are to be ſeen there; and no corn, or at leaſt very little. This climate produces no fruit, nor even any of the common vegetables ‡. This part, which is barren and almoſt

* Tom. i. pag. 416.

† A town ſituated on the borders of the ſea of Pengina. It has a port, where people embark for Kamtſchatka.

‡ Strahlemberg, deſcription de l'Empire de Ruſſie, tom. i. pag. 26, and all the travellers.

deſert,

deſert, extends three hundred and fifty leagues from weſt to eaſt, and two hundred from north to ſouth. The remainder of Ruſſia extends ſtill two hundred leagues towards the ſouth, and this is the only part where the ſoil appears fit for agriculture. The Ukraine is an exceedingly fruitful province, in which there is plenty of every thing. Moſt of the lands are cultivated in all the other provinces, from fifty-ſix degrees of latitude to the parallel of St. Peterſburg; yet the corn thrives there but indifferently *.

Hitherto the climate of Ruſſia has been conſidered only with regard to its produce, we ſhall now ſee that it affords new objects, of a very intereſting nature. By theſe we ſhall find a confirmation of that generally received opinion, that the more we advance towards the eaſt under the ſame parallel, going from Europe, the more the cold increaſes; and this obſervation holds good as far as towards America, which is authenticated by Mr. Deliſle's memoir, already ſpoken of. Theſe are his words †.

" From what I know of the methods people take to pre-
" ſerve themſelves from the extreme colds of Ruſſia and Sibe-
" ria, and what happens in warm rooms during theſe ex-
" ceſſive colds, I cannot think they are ever more ſevere than
" thoſe of which captain Middleton gives an account to the
" Royal Society of London, and which he experienced in the
" Engliſh colony at Hudſon's Bay, under fifty-ſeven degrees
" three-fourths of latitude.

" Although the houſes in which people are obliged to ſhut
" themſelves up for five or ſix months in the year are built of
" ſtone, the walls of which are two feet thick; although the
" windows are very narrow, and ſupplied with very thick

* Strahlemberg, tom. i. pag. 28.
† Volume de l'Académie de Paris de 1749, page 13.

" ſhutters,

" ſhutters, which are ſhut up for eighteen hours every day: " although very great fires are made four times a day in theſe " rooms, in large ſtoves, built on purpoſe; although the " chimnies are ſhut quite cloſe when the wood is conſumed, " and nothing but the burning embers are left, in order the " better to keep in the heat; yet all the inſide of theſe rooms, " and the beds, are covered with ice three inches thick, which " the people are obliged to remove every day. The only light " they have, in theſe long nights, is procured from balls of " iron, of four and twenty pounds, made red hot, and hung " up before the windows. All liquors freeze in theſe apart- " ments, and even brandy in the ſmalleſt rooms, notwith- " ſtanding a great fire is continually kept in them.

" Thoſe who venture out in the open air, defended even " with double and triple coverings and furrs, not only about " the body, but alſo about the head, neck, feet and hands, " are nevertheleſs benumbed with the cold at firſt, and cannot " return into the warm rooms, without loſing the ſkin of " their face and hands, and ſometimes having their toes " frozen.

" We may have ſtill a better idea of the external cold, " from the account captain Middleton gives of the lakes of " ſtanding water, which are not more than ten or twelve " feet deep, freezing down to the bottom; this happens alſo " to the ſea, which freezes to the above-mentioned depth, " although the ice is not more than nine or ten feet thick in " rivers neareſt the ſea, and where the tide is ſtrong.

" The extreme cold ſometimes makes the ice crack with " an aſtoniſhing noiſe, as loud as the exploſion of a cannon.

" With regard to the earth, Mr. Middleton thinks it is " never thawed at the bottom; becauſe, having had it digged " five or ſix feet deep in the courſe of the two months during

" which

" which the ſummer laſts, he had found it ſtill frozen, and " white as ſnow.

" Theſe effects are greater than thoſe commonly felt in " Siberia; which would induce one to believe, that the " froſts of Hudſon's Bay, and the neighbourhood, are at leaſt " as ſevere as the moſt intenſe froſts of Siberia. The only " way of being perfectly aſſured of this, is by obſervations " made with thermometers, as accurate as thoſe which have " been made uſe of to determine the cold in Siberia."

Theſe laſt obſervations make it more and more certain, that the cold increaſes as one advances eaſtward, ſo that this fact is now incontrovertable. This phenomenon has been chiefly accounted for in Siberia, from the prodigious height which has been attributed to the ſoil of this country, and the quantity of ſalt found in it. The diſpoſition of the ſoil in Siberia has ſtill been conſidered in another light. This country forms an inclined plane from the Frozen Sea as far as the frontiers of China, where the ſoil is higheſt, becauſe the two empires are ſeparated in this ſpot by chains of mountains. The ſun, ſituated towards the horizon of theſe mountains, cannot therefore impart much heat to this inclined ſoil, when it enlightens that hemiſphere, becauſe its rays will only glance over that ſurface of the globe. The extreme cold of this country is perfectly well accounted for from the combination of theſe ſeveral cauſes. But in what manner does the general effect proceed from either of theſe cauſes? It has been already ſhewn, that the ſoil of Siberia is not ſo much raiſed as it has been hitherto ſuppoſed to be. Theſe points deſerve to be farther diſcuſſed, for which purpoſe I ſhall be obliged to repeat ſome of the facts already advanced, in order to avoid confuſion. Laurentius Lange aſſerts, that the ridge of mountains which ſeparates Ruſſia from Siberia is more than two leagues high *."

* Journal du voyage de Laurent Lange à la Chine, tom. v. pag. 378. du recoeuil des voyages au nord, édition d'Amſterdam, chez Jean Frederic Bernard.

" The mountains of Verchaturia," ſays he, " are ſituated " between that place and Solikamſky. We paſſed over them in " ſuch extreme cold weather, that the coverings of our ſledges " were not ſufficient to protect us from it; and we were in ſo " much danger of loſing our noſes, that we could not poſſibly " proceed more than twenty werſts without ſtopping. We " had fifty werſts to go over theſe mountains, which are, I " believe, at their higheſt point, nine werſts high."

The firſt travellers have determined the great height of theſe mountains of Siberia, from obſervations ſuch as theſe. Moſt of thoſe who have come after them have been led away by the ſame prejudices, and have confirmed them; ſo that they have been afterwards conſidered as known facts: yet it is evident, from the level I have taken in the courſe of my journey, not only that theſe mountains are not very high, but likewiſe that the ground of Siberia, at leaſt as far as Tobolsky, is very low. As this has been already proved under the article of the levelling, it will be ſufficient to obſerve here, that the height of the middle of the chain near the hamlet Roſteſs, which is the moſt elevated point, is four hundred and ſeventy-one toiſes above the level of the ſea at Breſt, inſtead of five thouſand toiſes, which Laurentius Lange ſuppoſes it to be; and that the Irtyſz at Tobolsky is no more than 69 toiſes above the level of the ſea, four and twenty toiſes above the level of the great Obſervatory, and forty-eight toiſes above the level of the Seine at the Pont-Royal.

With regard to the other parts of Siberia, where theſe extreme colds have been obſerved, I cannot take upon me to determine, with preciſion, the height of thoſe lands, as I have never been upon the ſpot. M. Gmelin, however, has made obſervations there with the barometer, of which Mr. Braün has given an extract in the memoirs of the academy of St. Peterſ-

burg *: but this extract, and mere observations of the barometer, are not always sufficient to determine exactly the height of the places, where they have been made. I have made use of other methods to fix the exactness of my observations in the level I have taken. From the slope of the rivers which cross Siberia, one may, however, obtain results, which, though not exact, will still be sufficient to let us know, whether the height of these parts is such, as to be the principal cause of the cold in Siberia.

The river Loire has a very considerable slope: so that supposing the rivers of Siberia, which run across plains of five or six hundred leagues, to have equal slopes, the heights deduced from thence must be greater than they should be; therefore, by stating the mean slope of the Loire at four feet, seven inches, eight lines, *per* league of 2000 toises †, the heights calculated from thence will be found in the following table.

If all the rivers I have calculated from, were supposed to have the slope of the Irtysz, the height of these places would be less by about one fourth part.

* Tom. vi. p. 425.

† The slope of the Loire at Rennes, by leagues of 2000 toises, is,

	feet.	inches.	lines.
	6	11	4
At Orleans,	4	7	10
At Angiers,	2	3	11
Mean slope.	4	7	8

TABLE,

TABLE, containing the Heights, with reſpect to the Sea, of Places in Siberia where the greateſt Colds have been obſerved.

Names of the places.	Longitudes.		Latitudes.		Diſtances of of the rivers at their mouths.	Heights above the level of the ocean at Breſt, determined by the mean ſlope of the Loire.	Heights above the level of the ocean at Breſt, determined by the mean ſlope of the Irtyſz.	Mean heights above the ocean at Breſt.
	d.	m.	d.	m.	leagues of 2000 toiſes.	toiſes of France.	toiſes of France.	toiſes of France.
Aſtracan	68	12	46	15		obſerved		
Solikamſky	74	24	59	35		obſerved	——	187
Echaterinenburg	78	40	56	44		obſerved	——	220
Tobolſky	85	57	58	12		obſerved	——	69
Tomſk	102	38	57	3	500	426	132	279
Irtyſz. Lake Saiſan *	103	30	47	54	760	626	201	413
Mangaſea	107	0	65	36	200	154	53	103
Jeniſſeik	110	40	58	27	440	380	115	247
Irkutſk	122	38	52	18	900	775	236	505
Kiringa	125	54	57	30	750	618	197	407
Nerczinſk	133	48	51	48	660	549	172 in the mountains.	549 / 531
Argunſkoi	136	42	50	53	637	531	166	
Olekminſkoi	137	0	60	20	640	533	167	350
Jakutſk	145	52	62	0	400	349	105	227

* The lake Saiſan, where the Irtyſz riſes, is about ſeven hundred and ſixty leagues diſtant from the gulf Oblkaia, in the direction of the courſe of the river: ſuppoſing, therefore, the ſlope of this river equal to that of the Loire, determined at 4 feet, 7 inches, 8 lines *per* league of 2000 toiſes, the level of lake Saiſan will then be 626 toiſes above the level of the ſea. I have calculated from my obſervations the ſlope of the Irtyſz at Tobolſky, ſo that its mean ſlope may be reckoned at 1 foot, 7 inches, *per* league, and the lake Saiſan would then be no more than 200 toiſes above the level of the ſea. This height ſhould however be more conſiderable, becauſe the ſlope of this river muſt increaſe as one comes nearer to its origin; and I ſuppoſe we may come pretty near the truth, by taking the medium between theſe two reſults. This medium fixes the height of the lake Saiſan at 413 toiſes above the level of the frozen ſea.

In this manner I have determined the heights of all the places mentioned in the preceding table, except the four firſt: theſe have been determined by obſervations mentioned in the article of the levelling of Ruſſia. The heights of Nerczinſk and Argunſkoi, have been determined merely from the ſlope of the Loire; becauſe I ſuppoſe the ſlope of the river Amour to be very ſteep, its courſe being entirely among the mountains; whereas the other rivers of Siberia, having their courſe in the immenſe plain, which extends from this chain as far as the frozen ſea, muſt conſequently have their ſlopes much leſs ſteep. We muſt not indeed expect, as I before hinted, very accurate reſults from theſe calculations; they furniſh us, however, with a comparative point approaching nearly to the real ſituation of theſe places; whereas other travellers have all aſſerted, that Siberia was very high, without giving us any idea of the real height of the ſoil; and and thoſe who have done this, as Laurentius Lange, have been led into the groſſeſt miſtakes.

The results mentioned in this table confirm the observation all travellers have made, that the soil rises continually as one advances from Tobolsky towards the east. This city, situated in a latitude of 58 degrees, appears to be the lowest of all the places in Siberia lying under the same parallel: and indeed all the rivers, whose origin is to the west or to the east of the Irtysz, discharge themselves into this river. The places situated about the parallel of Tobolsky, and mentioned in the foregoing table, are, Solikamsky, Tomsk, Jenisseik, Kiringa and Olekminskoi. All these are among the number of places, in which the severest cold of Siberia has been felt. In the year 1735, it was observed, at 30 degrees at Tobolsky, while at Tomsk it was at 53 degrees and a half, and at 70 degrees at Jenisseik. The greatest difference of this cold is 40 degrees between Tobolsky and Jenisseik, while the difference of the respective height of these two cities above the level of the sea, is no more than 178 toises, which the town of Jenisseik has above the other. Now, so trifling a difference in height can have no relation to the difference of cold experienced at Jenisseik, and at Tobolsky; besides, the cold, in the same winter, was less severe at Tomsk by 18 degrees, than it was at Jenisseik; although the city of Tomsk is the highest, being 279 toises, and that of Jenisseik only 247. It is hardly necessary to dwell any longer upon this subject, in order to prove that the small differences in the heights of the above mentioned places cannot possibly produce those prodigious differences in the degrees of cold which the travellers have related.

The true cause, therefore, of the different degrees of cold felt in Siberia, seems to be accounted for from local circumstances, and from the quantity of salt found in several parts of it; which may be still farther confirmed by the following observations.

According to M. Gmelin's remarks before mentioned, the ground is not thawed at Jakutsk at the end of July. He even

ſuſpects that there are no ſprings in this part, becauſe the earth is always frozen. At Argunskoi, though nearly under the ſame parallel as Paris, ſeveral places are found, where the ground never thaws more than three feet deep, and theſe may be conſidered as perpetually frozen ſpots. This town, however, is not raiſed more than 531 toiſes or thereabouts, above the level of the ſea. Mr. Bouguer has obſerved the perpetual frozen ſpot at Peru, to be 2434 toiſes above the level of the ſea *. He thinks that according to the parallel of Paris, it ſhould be 1500 or 1600 toiſes. This ſpot ſhould therefore be the ſame at Argunskoi, ſince that town is nearly in the ſame latitude. It might be ſuſpected from this obſervation, that the earth at Argunskoi is higher than I ſuppoſe it to be: but we muſt not confound the frozen ſpot obſerved in Siberia by Mr. Gmelin, with that remarked at Peru by Mr. Bouguer; ſince they are owing to two very different cauſes. I do not even imagine, that there are any mountains in Siberia of ſuch a height, as that the conſtant frozen ſpot mentioned by Mr. Bouguer, can be found upon them; and indeed all the travellers, who have paſſed over the mountains ſituated between China and Siberia, have never taken notice of ſuch a ſpot. But let us return to our ſubject. The conſtant frozen ſpot, of which M. Bouguer ſpeaks, is owing to the prodigious height of the mountains called Cordeleirias des Andes; for it is well known that the cold increaſes in proportion as we riſe in the atmoſphere, which fact Mr. Bouguer accounts for. The air being leſs denſe and more tranſparent as we get farther from the earth, is therefore leſs heated by the immediate action of the ſun, on account of the readineſs with which the rays paſs through any very tranſparent body; whereas, towards the ſurface of the earth, the denſer air muſt be more heated by the mere action of the ſun. The heat is ſtill increaſed by the contact and vicinity of bodies

* Figure de la terre, pag. 48.

more

more denſe than thoſe it ſurrounds, and upon which it is diffuſed; conſequently, the air muſt be leſs heated than the more denſe bodies contiguous to it. If we place a thermometer in the ſun, and another in the ſhade, the firſt ſhall ſometimes riſe in ſummer-time 14 or 15 degrees above the latter. This thermometer points out the ſtate of the atmoſphere, and the firſt ſhews the effect produced by the immediate action of the ſun upon the earth.

Theſe few remarks, applied to the conſtant frozen ſpot obſerved by Mr. Gmelin, prove, with the utmoſt evidence, that it cannot be owing to the height of Argunſkoi, and that the cauſe of it muſt be very different from that which produces the conſtant frozen ſpot in the Cordeleirias mountains; for, if that was the caſe, the ſurface of the earth at Argunskoi would be perpetually covered with ſnow and ice, as at Peru; and the cold would increaſe in proportion as we got higher in the atmoſphere, whereas it is juſt the contrary. The froſt at Argunskoi is only found at the depth of three feet; the ſurface of the ſoil being completely thawed. The climate is alſo pretty temperate in ſome places, ſince it admits of the growth of vegetables. Nerczinsk, although ſituated under the ſame parallel, and only at the diſtance of 15 leagues to the northweſt, is in a temperate and exceedingly fertile climate; nevertheleſs it is a few toiſes higher than Argunskoi. Therefore the cauſe of the conſtant frozen ſpot in Siberia, is different from what it is at Peru; it does not of courſe imply any remarkable height, and it is a miſtake to attribute the exceſſive cold of Siberia to the prodigious height which has been improperly given to this country. This degree of cold is certainly owing to the ſalt in Siberia; which indeed is found in great quantities about Solikamſky, at Jeniſſeik, at Irkutſz, and in the Baraba. The extreme cold before mentioned muſt therefore be attributed to local and particular circumſtances. The

want of cultivation, may likewiſe be reckoned among the general cauſes. As we travel towards the eaſt, the earth becomes leſs populous, uncultivated and deſert. We meet with nothing but immenſe foreſts, which prevent the ſun from acting upon the ſurface of the earth; and marſhes and lakes, whoſe waters abſorb the rays of the ſun, and reflect very few of them. The cultivation of land has a conſiderable influence upon the nature of a climate.

Men live however in Siberia, though often expoſed, for ſeveral minutes, to cold which ſinks Mr. Reaumur's thermometer to 70 degrees; while, in the baths, they experience a heat which make it riſe to 60 degrees. M. Tillet has made it appear, that a woman in France bore, for the ſpace of ten minutes, a degree of heat which made the ſame thermometer riſe to 112 *. It was imagined, from Mr. Boerhave's account, that men could not bear a heat above 54 degrees, and that both animals and vegetables muſt periſh in cold below 34 degrees. It has been alſo thought, for a long time, that it was not poſſible to make an artificial heat exceeding 32 degrees; till Mr. Braun, of the academy of St. Peterſburg, congealed mercury, by a degree of cold, equal to 470 of Mr. Deliſle's thermometer, which anſwers to 170 degrees of Mr. Reaumur's †.

Theſe truths ſhew what progreſs we make in the knowledge of facts, and ſeem to bring us nearer to that of primary cauſes, which however may yet be for ever hidden from us.

* Volume de l'Académie de Sciences, de l'année 1764, pag. 195. des mémoires.

† Diſſertation de Mr. Braun ſur le froid artificiel, imprimée à Saint Peterſbourg, en 1759.

Of the government of Ruſſia, from the year 861, *to* 1767.

ACCORDING to the annals of Poland and Ruſſia, the laſt of theſe kingdoms has been governed by a ſucceſſion of Princes, Grand Dukes, or Czars, all of the ſame family, from the year 861 * to 1596. The firſt of theſe ſovereigns was named Rurich; the laſt, Fedor Iwanowich. During this interval of more than 700 years, the eldeſt ſons have always ſucceeded of courſe, without having any diſputes with their brothers, or any of their ſubjects. So long a filial ſucceſſion ſhould ſeem to prove, that Ruſſia was then a free ſtate. But the ſame annals, and all hiſtorians, aſſert, that the nation was ever governed by abſolute princes. According to all probability therefore, the government muſt have been rendered milder by ſome particular cuſtoms, ſince it does not appear that the ſtate was expoſed to any remarkable commotions till the death of Fedor Iwanowich.

Fedor Iwanowich died in 1596, leaving no children. Some hiſtorians aſſert he was poiſoned, and his daughter alſo, by Boris Godonow, his miniſter and favourite. The princeſs died before her father. Boris Godonow, having acquired great authority under the reign of the Czar Fedor, cauſed the young Demetrius, legitimate heir to the crown, to be murdered at Uglicz in 1597 †: he afterwards diſpatched the murderer he had employed. The caſtle of Uglicz was razed by his orders, and ſome of the inhabitants of the town were murdered, in order to make him appear innocent, and to give a ſtriking

* According to ſome hiſtorians, ſince the year 700.

† This prince was brother to the Czar Fedor, by another mother.

proof

proof of his attachment to the royal family. This deſpotic tyrant did not ſtop here; he alſo deſtroyed, under different pretences, all the princes who could poſſibly have any pretenſions to the crown, as well as all perſons in office who were attached to them; and heaping crimes on crimes, Boris ſeized upon the throne in 1598, and taking advantage of the conſternation of the people, cauſed himſelf to be crowned by them. Seated on a throne, ſtained with the blood of his kings, he was haunted with fear and miſtruſt. He thought himſelf ſurrounded by traitors, or new pretenders. He pronounced ſentence of death againſt every one of whom he entertained the ſlighteſt ſuſpicion: the blood of the innocent was continually ſpilt; the ſword of tyranny flamed all around, wickedneſs became virtue, and virtue, languiſhing and debaſed, did not dare to ſhew her head. By repeated crimes Boris eſtabliſhed the moſt ſhocking ſlavery, by which he expected to ſecure to himſelf the poſſeſſion of the throne; but was ſoon after driven from it by a new uſurper, who was himſelf aſſaſſinated in 1606. From this time, Ruſſia became a ſcene of anarchy and confuſion; freſh pretenders to the throne perpetually riſing up, who were ſucceſſively aſſaſſinated or dethroned; the commotions increaſed daily, and continued till the year 1613.

Although the realm of Ruſſia had never been elective, yet, under ſuch circumſtances, the nation was obliged to chuſe a ſovereign. Michael Romanof, grandfather of the Czar Peter, was elected this year, in an aſſembly of the chief nobles; and the Ruſſians ſubmitted themſelves to a youth of fifteen, without making any conditions *. From the readineſs with which they conſented to a change of the old conſtitution, it may be concluded, that it had not been formed by them, that they had

* M. de Voltaire, tom i. page 80, édition de Paris, chez Panckoucke.

not the leaſt notion of liberty, or that they were extremely degenerated.

Alexis Michaelowitz, his ſon, came to the throne in 1645, without any other form of election. His reign was diſturbed with ſeditions and civil wars; chiefly occaſioned, it ſeems, by the deſpotic ſway, which Morozou, favourite of the Czar, exerciſed over the empire. Mr. Voltaire obſerves, "That this "part of the world being leſs reſtrained by manners than any "other, it was neceſſary it ſhould be reſtrained by corporal "puniſhments, and that thoſe puniſhments gave birth to "ſlavery *.

After the death of the Czar Alexis, which happened in 1677, the nation became more and more enſlaved. This prince had been twice married. From the firſt marriage he had the two princes, Fedor and Iwan, with ſix princeſſes; the fruits of the ſecond, were Peter the Firſt, and one princeſs. Fedor came to the throne at 15 years of age, and died in 1682, without children †. Perceiving that his brother Iwan, too ill-favored by nature, was unfit to reign, he named, on his deathbed, his ſecond brother Peter, who was not more than ten years old, his ſucceſſor to the throne. The princeſs Sophia, daughter of Fedor, from the firſt bed, formed the deſign of placing herſelf at the head of the empire. This princeſs, whoſe ſchemes were the more dangerous, on account of the ſuperiority of her underſtanding, continued ſtirring up the moſt bloody rebellions for the ſpace of about ſeven years. In theſe calamitous times, treaſons and public murders conſtantly prevailed. The nation was in the utmoſt confuſion and diſorder. The Strelits ſpilt blood on all ſides, and practiſed unheard-of cruelties; the life of the ſovereign was as much expoſed as that

* M. de Voltaire, page 83.
† M. de Voltaire, page 87, et ſuivantes.

of

of his ſubjects. Sophia was at length ſhut up in a convent; but the nation, inured to rebellion and ſlaughter, was with difficulty reſtrained from repeating the ſame crimes. Peter the Firſt, in 1689, taking the reins of government in his own hands, conceived the deſign of reforming and civilizing his nation: but being more abſolute than any of his predeceſſors, he drew the bands of ſlavery ſtill cloſer. The vaſt projects of this great man are well known; he died in 1725, in the midſt of his labours, and the Empreſs Catherine his wife in 1727.

Peter Alexiowitz, grandſon to Peter I. ſucceeded to the throne, and died in 1730. The prince of Olgorouki, and count d'Oſterman, who compoſed the high council, ſuppreſſed the will of the Empreſs Catherine, and raiſed a report, that Peter II. on his deathbed had, named the princeſs, dutcheſs dowager of Courland, his ſucceſſor. She was the daughter of John, elder brother of Peter I*, but by another wife. This princeſs being kept from the throne by the children of Peter I. was obliged to conſent to terms, by which her power was limited. The prince of Olgorouki, and count d'Oſterman, had propoſed to keep the reins of government in their own hands; but ſhe had ſcarcely aſcended the throne, when ſhe aſſumed the ſame authority as the ſovereigns her predeceſſors.

This princeſs had brought with her, her favourite Biren, a native of Courland. In the name of the Empreſs Ann, he ruled the Ruſſians with a rod of iron. He ſeemed already to have conceived the deſign of making himſelf one day maſter of the throne. He ſubdued the nation by inflicting puniſh-

* The will of the Empreſs Catherine, which had never been made public, regulated the ſucceſſion of the Ruſſian empire: the dutcheſs of Holſtein, and the princeſs Elizabeth, daughter of Peter I. and of the Empreſs Catherine, were to ſucceed to Peter Alexiowitz, Strahlemberg, tom. i. pag. 225.

ments, and ſending a number of exiles into Siberia. After the death of the laſt prince of the houſe of Ketler, the Empreſs Ann created him duke of Courland; and at her death, in 1740, ſhe appointed him regent of the empire, till the majority of her niece's ſon, who was only two months old. This young prince was proclaimed Emperor by the name of Iwan, or John III. and the duke of Biren, though hated by the nation, had the title of regent.

The princeſs of Brunſwic, the Emperor's mother, could not however bear the ſway of the regent; ſhe therefore thought of ſhaking it off, and pitched upon general Munic, a ſtranger in Ruſſia, to aſſiſt her in the undertaking. Munic was well acquainted with Biren and with the Ruſſians; and aſſured the princeſs, that as ſhe had thought of this ſcheme, ſhe was in the greateſt danger of being arreſted with her party, if Biren himſelf was not arreſted within four and twenty hours. Munic took this taſk upon himſelf, and went away immediately. In order to remove all cauſe of ſuſpicion from the regent, he ſet out with intention to pay him a viſit; but returned when he had got half way to the houſe, fearing leſt he might be followed by ſome ſpy from the princeſs, and be ſuſpected of betraying her. He went directly home, where he remained till midnight, on the 18th of November 1740. He then took a few truſty ſoldiers with him, and ſeized upon Biren in his bed; Biren was baniſhed a few days after into Siberia, where he was ſhut up in a houſe, built in the middle of a marſh, and the princeſs of Brunſwic was declared regent.

The various revolutions Ruſſia had already experienced, made way for others, and facilitated the ſucceſs of them. The people, always enſlaved, were not attached to their ſovereign, either by laws or affection: ſo that the crown was expoſed to

every one who had courage enough to ſeize upon it, by policy or ſuperior ſtrength.

Leſtoc, a foreign ſurgeon, attached to the princeſs Elizabeth, daughter of Peter the Firſt, in conjunction with an ambaſſador of an European power, formed the deſign of placing her upon the throne. Juſt as the deſign was going to be carried into execution, the regent was informed of it by advices ſhe received from Bruſſels. She ſent for the princeſs Elizabeth, and mentioned the circumſtance immediately; firmly perſuaded that ſhe could not be able to impoſe upon her in the firſt inſtant of ſurprize. The countenance of the princeſs Elizabeth, and her mildneſs, convinced the regent of her innocence. Elizabeth went home, told Leſtoc, that the conſpiracy was diſcovered, and that ſhe renounced the empire. Leſtoc heard her, retired, and went to diſpoſe every thing for fixing her upon the throne in a few hours.

Leſtoc, having ſeen the chief conſpirators, went to the billiard-table towards eight in the evening; there he found a ſuſpicious perſon, whom it was neceſſary to hinder from going about the town; the paſſion this ſpy had for play, made it eaſy for him to effect his purpoſe. He engaged him in a few games at billiards, and detained him till the arrival of one of his emiſſaries. Upon that, Leſtoc ſoon finiſhed his game. He went away almoſt immediately, and took a turn round the palace, to ſee that every thing was in its uſual ſtate. From thence he went to the parade, where he waited till eleven o'clock for another emiſſary, whom he had ſent to general Munic's, and to count d'Oſterman, the prime miniſter's houſe. Upon being informed that every thing was quiet, he returned to the princeſs Elizabeth, and had two ſledges brought into her court-yard. With an air of ſatisfaction he told her, all was diſpoſed for placing her on the throne. She rejected every propoſal, and refuſed to hear any thing farther. He then took

out of his pocket two ſmall drawings haſtily taken upon cards. One of them repreſented the princeſs Elizabeth in a convent, where they were cutting off her hair, and Leſtoc was upon a ſcaffold. In the other, ſhe was repreſented aſcending the throne amidſt the acclamations of the people. Leſtoc, at the ſame time that he gave her theſe two drawings, deſired her to chuſe between the two ſituations; ſhe choſe the throne.

Leſtoc now ſpoke to her only about the ſucceſs of the enterprize: he perſuaded her to put on the ribband of the Order of Ruſſia, and led her to her ſledge. He placed himſelf behind her, with the late Mr. Woronzof, then page to the princeſs. There were two officers in the other ſledge; and Elizabeth, attended only by four perſons, advanced towards the palace, to ſeize upon the empire. Twenty ſoldiers, however, who had been gained over, waited for the princeſs as ſhe paſſed along. She went directly up to the guard. At the ſight of this ſmall troop, the drummer prepared to ſound the alarm, Leſtoc burſt the drum at once with a knife. The princeſs appeared immediately, with that noble mien which captivated all hearts: ſhe told the ſoldiers in a few words, that the ſole right of the throne, which the regent had uſurped, was veſted in her, as daughter of Peter the Firſt; then ordered them to take the oath of allegiance, and to follow her. She ſpoke to ſlaves; they proſtrated themſelves before her, and joined her ſmall company. Leſtoc diſtributed the confidential people in the moſt ſuſpicious poſts, and kept the reſt along with him; their fidelity he was aſſured of, as he was always at hand to command them. All the guards of the palace yielded at the bare command of Elizabeth. She came at laſt to the door of the regent's chamber, who was faſt aſleep, and had the emperor her ſon, the young Iwan, by her ſide. Here Elizabeth firſt met with oppoſition; the officer on guard preſented his bayonet, and not only put himſelf in

a poſture of defence, but alſo threatened to kill all thoſe who ſhould come forward. Leſtoc immediately cried out to him with a loud voice, *Wretch, what doeſt thou mean? aſk mercy of the Empreſs.* The ſlave inſtantly betrayed his ſovereign; and Elizabeth entered the apartment with her followers. The regent had been awakened by the noiſe ſhe had heard. The princeſs Elizabeth addreſſed her firſt, and the regent ſaid, *What, madam, is it you?* She was directly ſeized, carried out of the palace, with the young Iwan her ſon, and conducted to the houſe of the princeſs in the ſame ſledges which had brought her rival; where ſhe was carefully watched. Elizabeth ſeated on the throne of her forefathers, commanded as empreſs in the palace, and all obeyed. In the mean time Leſtoc ſent ſome truſty ſoldiers to arreſt Munic and d'Oſterman. A few hours were ſcarce elapſed ſince the princeſs Elizabeth came out of her houſe, before the regent was dethroned. All ſuſpicious perſons were ſeized, and five or ſix thouſand men took the oaths of allegiance to the princeſs Elizabeth, determined to murder both the regent and their emperor, if Elizabeth ſhould command them, or to aſſaſſinate her, if the regent could poſſibly take the command for one inſtant. The rumour of the princeſs Elizabeth's acceſſion to the throne began, however, to ſpread: but the perſons who propagated the news in public, were looked upon as very dangerous people, ſo that it was cuſtomary to run away from them without anſwering one word.

Leſtoc had had an eye to every circumſtance. While he was conducting his ſovereign to the throne, the manifeſto which proclaimed Elizabeth empreſs, was printing; and almoſt as ſoon as the ſun ſhone upon the horizon, ſhe was acknowledged throughout the capital, and ſoon after by the whole nation.

The regent, ſent back at firſt into her own dominions with her ſon, had already got as far as Riga, when freſh orders came

came to ſtop her. Being brought back to St. Peterſburg, ſhe was there impriſoned for ever, as well as her ſon. Munic and d'Oſterman were baniſhed into Siberia; and in this revolution, which took place from the 5th to the 6th of October 1741, there was not one drop of blood ſpilt. The Empreſs Elizabeth reigned till the year 1762, frequently diſturbed with the apprehenſions of being dethroned in her turn. She ſent for her nephew the duke of Holſtein, and married him to a princeſs of Anhalt-Zerbſt.

Leſtoc, attached to his ſovereign from her infancy, enjoyed alſo the peculiar happineſs of being truly favored by her, although he had placed the crown upon her head. He was created count of the empire, and married one of the maids of honor belonging to the empreſs. Her majeſty beſtowed favors upon him inceſſantly: but at a time when he was in the higheſt eſteem, Beſtuchef, his avowed enemy, a ſubtle and crafty man, opened a treacherous plot he had been meditating againſt him for a long time. He gained ſo far upon the weak mind of the Empreſs Elizabeth, as to cauſe Leſtoc and his wife to be arreſted. They were exiled into Siberia, and all their poſſeſſions confiſcated. Beſtuchef in his turn was likewiſe baniſhed. The Ruſſian court appeared more quiet on the outſide for a long time; but internally, envy, jealouſy and miſtruſt, reigned throughout this immenſe palace. The Grand Duke did not live with his wife. The princeſs of Anhalt-Zerbſt, born in a free country, and brought up in the midſt of the muſes and the arts, was not dejected by this event. Her genius, and the knowledge ſhe had acquired, ſupplied her with the moſt agreeable relief; amidſt the commotions of the court ſhe contrived to live in a ſtate of tranquillity. She had married the duke of Holſtein, with no other view than that of obtaining the right of ſucceſſion to the throne, which was granted to her. While ſhe lived in this retired

retired manner, ſhe employed herſelf entirely in acquiring an inſight into men, and learning the arts of government. As her thirſt after knowledge was unlimited, ſhe paſſed her leiſure hours in the cultivation of the ſciences, of the arts, and of literature. Perceiving the talents the princeſs Daſchkof was poſſeſſed of, ſhe made her partner of her pleaſures. But the Grand Duke, jealous even of her amuſements, put her to the neceſſity of keeping up her correſpondence in a private manner with this young princeſs, ſiſter to the lady Woronzof. I have read a letter of this young princeſs upon friendſhip, which would not be diſowned by our beſt writers.

I was ſtill at St. Peterſburg, when the death of the Empreſs Elizabeth, who ſuffered under a tedious illneſs, was daily apprehended. She was beloved by the whole nation, who feared the reign of Peter III. She died in the month of January 1762.

Peter III. aſcended a tottering throne, of which he would perhaps have been for ever deprived, had the Empreſs lived ſeven or eight days longer. At the inſtant of his acceſſion to the empire, ſome orders, not rightly underſtood, excited commotions which ſeemed to portend a revolution expected by every body. Some private perſons had even taken care to place their fortunes in the hands of the miniſters belonging to their reſpective nations. But Mr. Glebof, a Ruſſian, had been bold enough to give ſome advice to Peter III. during the illneſs of the Empreſs. The inſtant of her death, Peter III. aſſumed the command, and was acknowledged Emperor. The Empreſs, his wife, came, and fell at his feet; and ſtriking her head againſt the ground, paid him homage as the firſt of his ſlaves. All his ſubjects alſo took the oath of allegiance, and he enjoyed the empire in peace. He immediately recalled all exiles from the reign of the empreſs Ann, and I had the ſingular ſatisfaction of ſeeing Biren, Munic, and Leſtoc, all together at St. Peterſburg.

Peter III. quitted his old palace, to take poſſeſſion of the new one, leaving the empreſs in the former. He gave himſelf up in an indecent manner to pleaſures and diverſions, at which the empreſs, whom the Ruſſians had always held in the higheſt reſpect, was never preſent.

About a month after his acceſſion to the throne, he went to the ſenate, and declared that he granted the privilege of freedom to the nobility. The ſatisfaction this news filled the nation with, was too great to be deſcribed. In the firſt fit of enthuſiaſm, they propoſed to erect a ſtatue of maſſy gold to him; but ſomebody obſerving, that there was not gold enough in the whole empire for ſuch a purpoſe; the juſtneſs of the reflection determined the Ruſſians to confine themſelves to a ſtatue one foot high, which was to be placed in the ſenate-houſe. A ſtatue of bronze was ſoon after ſubſtituted in the place of this, and at length the nation ſeemed reſolved for one of marble.

It was neceſſary, however, that the emperor ſhould publiſh an edict, in order to confirm this grant of freedom to his people; ſo that, in conſequence of the repreſentations of ſome officers of ſtate, Peter III. limited the freedom granted to the nobility, to the permiſſion of not ſerving in the army, and being allowed to travel with his conſent. In conſequence of this edict, a Ruſſian officer, deſirous of quitting the ſervice, applied to the emperor for leave. The emperor aſked, *What is your rank? Captain*, replied the officer. *Well then*, ſaid the emperor, *I make you a lieutenant, and you ſhall ſtill ſerve*; and accordingly he did ſerve as lieutenant.

Part of the nation, however, was pleaſed with the emperor's familiarity; but his public and private conduct were both equally diſguſtful to the more ſenſible people. Entirely abſorbed in his pleaſures, a ſudden revolution removed him from the throne, and fixed the empreſs there in his ſtead. From

that

that moment the lives and fortunes of the ſubjects depended on the ſole will of that princeſs. They proſtrated themſelves before her, ſwearing the moſt faithful allegiance to her, as to the ſovereigns her predeceſſors. But the unexpected deaths of the emperor, and of the young Iwan, conſpired to ſecure to her the poſſeſſion of the empire.

As ſoon as the ſovereign is on the throne, he is ſuppoſed to have no more relations, and no one dares to claim any connection with the royal family. A foreign courtier, having found that the counteſs of Woronzof was related to the empreſs Elizabeth, went immediately and complimented her with the news, which he thought was a diſcovery of political importance: the empreſs turned pale, and told him he was miſtaken.

It was forbidden, on pain of death, to keep any coin ſtamped with the image of the young Iwan. The people dare not play with roubles, which bear the impreſſion of the ſovereign. One cannot paſs before the palace, facing the emperor's apartments, without pulling off one's hat, or letting down the glaſs, if one is in a carriage; otherwiſe one is expoſed to inſults from the ſoldiers. Any perſon who ſhould write the name of the empreſs in ſmall caracters upon a letter, would be liable to be ſeverely puniſhed for it.

Theſe trifling circumſtances are mentioned merely to give an idea of the extent of the abſolute power of Ruſſian monarchs.

The nobility dare not come near the throne without fear and trembling. They are baniſhed into Siberia for the ſlighteſt political intrigue, and their poſſeſſions being confiſcated, one whole family thus falls a victim to the artful inſinuations of the courtier. When I was at St. Peterſburg, I was one day on a viſit at the houſe of a ſtranger, who was in office; being deſirous of information, I aſked whether the

prince Iwan was living or not: it was immediately whiſpered in my ear, that in Ruſſia no one ſpoke of that prince. We were, however, no more than three Frenchmen in the room, which was upwards of thirty feet ſquare. On the eve of the death of the empreſs Elizabeth, no one dared to inquire concerning her health; and when ſhe was dead, though it was univerſally known, yet every body was afraid to ſpeak of it.

The mutual diſtruſt, in which people live in Ruſſia, and the total ſilence of the nation upon every thing which may have the leaſt relation either to the government, or to the ſovereign; ariſes chiefly from the privilege every Ruſſian has, without diſtinction, of crying out in public, *Slowo Dielo*; that is to ſay, I declare you guilty of high treaſon both in words and actions. All the byſtanders are then obliged to aſſiſt in taking up the perſon accuſed. A father arreſts his ſon, and the ſon his father, and nature ſuffers in ſilence. The accuſed, and the accuſer, are both conveyed immediately to priſon, and afterwards to St. Peterſburg, where they are tried by the ſecret court of chancery.

This tribunal, compoſed of a few miniſters choſen by the ſovereign, leaves the lives and fortunes of all families at their mercy. This juriſdiction is of ſo odious a nature, that a ſubject, who ſhall even be indifferent to theſe agents of tyranny, is often found guilty, although the accuſer ſhould not be able to bring convincing proofs of the crime; and this happens chiefly when the impeacher anſwers for the guilt of the perſon accuſed, with his own ſhoulders; that is to ſay, ſubmits to receive the puniſhment of the knout. If he bears this without recanting, the perſon accuſed is found guilty, condemned to death, and part of his eſtate forfeited to the accuſer. If ſome very extraordinary circumſtances indicate the innocence of the perſon accuſed, the impeacher is then puniſhed a ſecond time. He is alſo puniſhed, but only once, when,

when, not having demanded the trial of the knout, he is found incapable of proving the guilt of the man whom he impeaches.

This juriſdiction has been eſtabliſhed, merely that tyranny might enjoy the privilege of ſacrificing all ſuch perſons as have become the object of deſpotic jealouſy. It was therefore neceſſary that the crime of the falſe accuſer ſhould not be puniſhed with death; and the puniſhment of the knout was always made milder in his favor.

The nobility, thus bowed under the yoke of the moſt dreadful ſlavery, do not fail to retaliate upon the people: the people are ſlaves to them, to the ſovereign, or to the waywodes who repreſent him.

Two kinds of ſlaves are diſtinguiſhed in Ruſſia among the people: ſome belong to the ſovereign, others to the nobility. The firſt only pay tribute to the empreſs, the others both to the ſovereign and to their lord. The nobles eſtimate their riches by the number of farmers which belong to them. The ſlaves of the crown pay in to the royal treaſury, the ſum of one hundred and ten copecs, or four ſhillings and ſeven pence of Engliſh money, and the others pay two ſhillings and eleven pence to the crown *. The lords impoſe what tax they pleaſe upon their ſlaves, and ſometimes ſeize upon the ſmall fortune they may have acquired by their abilities. If theſe ſlaves, by cultivating the land and by induſtry, do not get enough to pay the lord, he allows them to hire themſelves to merchants, ſtrangers, or other perſons who have no ſlaves. For this purpoſe, he gives them a paſſport only for a few years. The ſlave is obliged to remit his wages annually to his lord, who gives him up what he thinks proper out of them.

The lords ſell their ſlaves, as cattle is ſold in other parts of the world. They chuſe out from among them the number of

* The article of the taxes ſhall be more fully ſpoken of under that of the revenues of the Ruſſian empire.

ſervants

ſervants they want; and treat them with great inhumanity. They are not allowed a civil power of life and death over their ſervants, any more than over their other ſlaves; but as they have the privilege of puniſhing them with the *padogi*, they have them chaſtiſed in ſuch a manner, that they may be ſaid, in fact, to have acquired the right of putting them to death.

In weighty offences, a lord, according to law, ought to bring his ſlave to be tried at the ordinary courts of juſtice. In 1761, the ſenate publiſhed an edict, whereby all the lords were allowed to ſend any ſlaves they were diſpleaſed with to work in the mines; but the lords prefer, and will ever do ſo, chaſtizing them at home, and keeping them to themſelves.

This people, thus oppreſſed by ſlavery, is now governed by the empreſs of Anhalt-Zerbſt; a woman of an extenſive genius, who is ſenſible of the defect of ſuch a kind of government, and is wholly employed in reforming it. She will not certainly confine the privilege of freedom to the nobility, but will extend this advantage to all her ſubjects. Humanity pleads for it, and true policy demands it. Without this circumſtance the empire of Ruſſia would be nothing more than a feudal government; and which, conſidered in this view alone, would multiply petty tyrants, and deſtroy all ſovereign authority. Happy the nation, if ſenſible of the bleſſing of being governed by ſuch a prince; all whoſe endeavours tend to procure happineſs to this people, which under Peter III. was on the point of falling into its primitive ſtate of barbariſm. She is erecting a monument to Peter the Firſt, in order to immortalize, and convey to the lateſt poſterity, the memory of that great man: ſhe encourages the arts and ſciences, and every branch of political adminiſtration; and ſhews that very nation, that ſhe alone was worthy to fill the throne of Peter the Firſt.

Of

Of the Greek Religion.

THE religion which prevails in Siberia, as well as throughout Ruſſia, is the Chriſtian religion of the Greek church. It was firſt eſtabliſhed in Ruſſia by Wolodimer in the year 987. In the reign of the Czar Fedor Iwanowitz, the metropolitans of Ruſſia were ordained by the patriarchs of Conſtantinople. Jeremy, patriarch of Conſtantinople, came to Moſco in 1588, and conſecrated Job patriarch of all Ruſſia. From this time, the patriarchs of Ruſſia were conſecrated by the biſhops of the country: but according to Strahlemberg, they were ſtill confirmed by the patriarch of Conſtantinople, till the time of the patriarch Nicon, who firſt ſhook off this ſubjection. According to Voltaire, in his hiſtory of Ruſſia (pag. 66.) the period of this independance may be traced as far back as the time when the firſt patriarch was appointed in Ruſſia.

The Greek church differs from the church of Rome chiefly in the following articles: The Greeks adminiſter baptiſm by dipping, the Romans by ſprinkling: the laſt conſecrate with unleavened bread, the firſt with leavened bread, and they alſo adminiſter the Lord's Supper in both kinds. The Romans believe that the Holy Ghoſt proceeds from the Father and the Son; the Ruſſians, that the Holy Ghoſt proceeds from the Father by the Son. The preciſion of ſcholaſtic divinity has made a great difference between theſe two aſſertions; from whence many diſputes have ariſen. Notwithſtanding this, ſeveral of the fathers have often uſed both theſe modes of expreſſion, In the Romiſh church, the pope is acknowledged as the firſt biſhop by divine right, and as ſuch is the center of the unity of the church. The Ruſſians do not admit the

pope's

pope's ſupremacy; and, in their catechiſm *, they condemn the opinion of the Romans concerning purgatory: but they believe, that thoſe who die in actual ſin are not always damned, but that they may be redeemed even from the greateſt crimes, by prayers and alms offered up for the dead †.

* I tranſlated from the Latin what is here related from the Ruſſian catechiſm, which was lent me for a few days in the year 1765, by the Ruſſian ambaſſador's chaplain. It was publiſhed at Breſlaw in 1751, by John James Korn.

† Are there not ſome among the dead, who are in a middle ſtate between ſalvation and damnation?

Anſwer. There is no ſuch ſtate; but it is certain that many perſons have been taken out of hell, not by repentance after death, but by the pious offices of the living, and the prayers of the church; particularly by the ſacrifice of the maſs, which is commonly offered up for all the living and the dead. Otherwiſe, theſe ſouls cannot be ranſomed by their own works, nor by repentance; neither can they do any thing to deliver themſelves from hell.

65. What are we to think of alms and pious offices for the relief of the dead?

Anſ. Theophylact gives the following commentary on the words of our ſaviour, in the 12th chapter of St. Luke: *Fear him who has the power to caſt you into hell.* Obſerve, ſays Theophylact, that Jeſus Chriſt does not ſay, *Fear him who after death caſts you into hell*, but, *fear him who has the power to do ſo*; for all men in general who die in ſin, are not caſt into hell; but it is in the power of God either to puniſh them in this manner, or to have mercy upon them. I obſerve this on account of the offerings and alms offered up in favor of the dead, as they are of great uſe even to ſuch as have gone out of the world defiled with the moſt heinous crimes. Let us therefore perſiſt in our endeavours, by prayers and almſgiving, to appeaſe the wrath of him, whom it doth not always pleaſe to exert the power of forgiveneſs, which is ſtill ever in his hands. We muſt then conclude from the doctrine of ſcripture, and this father's expoſition, that it is abſolutely neceſſary to ſay prayers, to give alms liberally, and above all to offer up maſs for the dead, as they are not able to do any of theſe works in their own behalf.

66. What are we to think of purgatory?

Anſ. A temporary puniſhment for the purification of ſouls, is no where mentioned in ſacred writ. On the contrary, it is on this account that Origen's opinion is cenſured by the church. It is evident enough, that when the ſoul is once ſeparated from the body, it can no longer be a partaker of any ſacrament of the church; for if the ſoul could itſelf atone for any faults committed, it might certainly receive ſome advantages from the ſacrament of repentance. This opinion being quite contrary to the true orthodox doctrine, it is with reaſon that the church offers up the holy ſacrifice, and prayers to God, for the pardon of thoſe who have formerly ſinned during their life; and not that they may be purified by any puniſhments they undergo. The ſaying of maſs, together with the prayers and alms offered up by the living in their behalf, are of themſelves ſufficient to relieve and redeem them from hell.

This

This catechiſm inſiſts much on the neceſſity of almſgiving at church, in order to be happy in the other world. It was by means of this doctrine, that the Ruſſian clergy enriched themſelves ſo much, during the warmth and zeal of the firſt chriſtians. The Czar Wolodimer, while the Tartars were employed in ſubduing part of his dominions, went himſelf through another part of them with his patriarch Cyrus, teaching this doctrine to his ſubjects, which was by no means agreeable to the poorer ſort. The prieſts canonized the Czar Wolodimer, but his ſucceſſors forbad any farther donations to the church, and, after a tedious war, expelled the Tartars from Ruſſia.

According to the 28th article of this catechiſm, "God introduces the ſoul into the body, as ſoon as the organs are formed. It immediately expands itſelf all over the frame, in the ſame way as fire inſinuates itſelf in all the parts of a red hot iron; but its chief reſidence is in the head and the heart."

In other parts of the ſame work, however, the ſpirituality of the ſoul is admitted.

The 18th and 43d articles of the catechiſm declare, that, "the intention alone of committing a mortal ſin does not quite give death to the ſoul, although it gives it a deep wound. No ſin can be truly mortal, unleſs actually committed. All others are in the claſs of venial ſins, which are to be atoned for by prayers and good works."

Peter I. aboliſhed patriarchs in Ruſſia, and in the year 1719, inſtituted a perpetual ſynod in their ſtead. It conſiſts of a preſident, an office which the czar reſerved for himſelf, a vice-preſident, who is an archbiſhop, ſix counſellors, who are biſhops, and ſix archimandrites or abbots. The ſynod is obliged to refer all important matters to the Czar in the ſenate,

where they go in a body, and take their ſeat below the ſenators *.

The Ruſſian clergy is divided into two bodies, monks and regular prieſts, who are called *Popes*. All the monks of Ruſſia are of the order of St. Baſil, whoſe inſtitutions they follow. They live together in common: they are not allowed to eat meat, but live entirely on fiſh, eggs, and a milk diet. They are even to abſtain from this ſort of food in Lent ſeaſon, as well as on Mondays, Wedneſdays and Saturdays throughout the year.

The ſuperior clergy, conſiſting of archbiſhops, biſhops, and archimandrites or abbots, are taken from the monks; ſo that they are all obliged to follow the rules of Saint Baſil's order: but the archimandrites are the only perſons among the ſuperior clergy who live in communities; which are all ſubject to the archbiſhops and biſhops. The prieſts cannot have any of the dignities of the higher clergy: they are all married; they muſt wed a virgin before they are conſecrated, and are obliged to abſtain from ſaying maſs, whenever they have indulged themſelves the night before. If they become widowers, and are no longer of uſe in maintaining their children, they generally turn monks; and in caſe of competition for a biſhopric or an abbey, the monk who has been married has the preference. It is cuſtomary for the children of prieſts to continue in their church, and take orders, although they are allowed to follow any other kind of life.

All the riches of the Ruſſian clergy are divided among the biſhops and monks. The prieſts are very poor, becauſe the livings and pariſhes are too numerous; moſt of their profits depend on caſual circumſtances.

* Strahlemberg, tom. ii. pag. 103. M. de Voltaire in his hiſtory of Ruſſia, tom. ii. pag. 229. ſays, that the ſynod ranks with the ſenators.

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The biſhops are named by the ſynod, but the nomination muſt be confirmed by the ſovereign. The biſhops nominate to the abbeys, and all the preferments of the inferior clergy: they may be removed, as well as the abbots, and depend entirely on the biſhops pleaſure. This exceſſive ſubordination gives the biſhops too much power over the inferior clergy: the monks and prieſts are no better than ſo many ſlaves; they appear in a ſubmiſſive poſture, and in a ſtate of humiliation, whenever they come before the biſhops. The prieſts are not held in much eſteem in ſociety, or among the monks, who are their ſuperiors: their condition would ſtill be more wretched, if their wives did not contribute to make the monks behave more mildly to them.

The clergy of Ruſſia are ignorant, drunken and libidinous. The biſhops and prieſts are leſs addicted to women than the reſt: the firſt on account of their years, the laſt becauſe of their wives: but they make up for this in drinking.

They make their wine with plants, a few drugs, and ſome brandy. They have beer, and a ſort of mead, the baſis of which is the fluid oozing from the birch-tree at the beginning of ſummer. Their favorite drink is brandy, and another liquor they call *crematum*; which is ſo ſtrong, that the firſt time I drank of it, I thought I had ſwallowed aqua fortis: it produced ſo violent an irritation in my mouth, that I could neither ſpeak nor ſpit out; I reſolved from that time never to drink any more *crematum*.

One of theſe prelates, in other reſpects an agreeable man, aſked me to go and ſee his library, and immediately ſhewed me the way to it. I followed him, very anxious of knowing what books he had, and he led me into an inſulated building in the midſt of a garden. We came into a very neat and well-lighted gallery; ſeveral niches, of a foot ſquare, were made in the wall. The prelate opened the doors of them, and I perceived

they were fillled up with caſks. Theſe caſks, containing various liquors, and ſurrounded with ice, filled the whole building, and conſtituted his library. He had built a very pleaſant apartment above this kind of icehouſe.

I met with prieſts in company, and eſpecially monks, ſo drunk, that they were obliged to be carried away on a litter, decent people being put to the bluſh by their actions and diſcourſes. The clergy are often found in the ſtreets unable to walk home.

We muſt not, however, form our opinion of all the Ruſſian clergy from this diſadvantageous repreſentation of them. In the courſe of my journey, I have met with clergymen of abilities and of irreproachable manners, among which I could mention ſome archimandrites and prieſts of Tobolſky, to whom the archbiſhop gave an excellent example in this particular. This prelate had not indeed much knowledge beſides what concerned his miniſtry: but a zeal, better directed, ſeemed only to be wanting to complete his caracter.

The Sorbonne propoſed to the Czar, in 1717, a reunion of the Greek with the Roman church: and every thing that paſſed on this occaſion is well known. If this ſociety did not ſucceed in the attempt, they acquired at leaſt ſo high a reputation among the clergy of Ruſſia, that they imagine no man in France can be learned, unleſs he is a member of that illuſtrious body.

It would be very uſeful, if the eſteem in which this ſociety is held in France, could be extended to thoſe who give themſelves up to the education of our youth. The Ruſſians have the greateſt reſpect for their governors and teachers; and conſider them as the fathers of their pupils. If the education in Ruſſia does not anſwer as it might be expected from ſuch behavior, it is becauſe honor and virtue can only ſpring up in the ſoil of liberty.

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The nobility of Ruſſia never enter into the prieſthood; ſo that there is no intermediate ſtate in the eccleſiaſtical body, which is made up entirely of the common people, or the children of the prieſts, who are often the moſt diſſolute; ſo that the ignorance and depravity of the Ruſſian clergy are the natural conſequences of their not having received any principles of education. Their power was dangerous only in the times of the primitive church, as they were then a better conſtituted body; and that the whole nation was inflamed with zeal, which is no where to be found at preſent, but among the lower claſs of people.

The revenues of the church being increaſed, and having never been expoſed before Peter I. to the changes, to which the fortunes of individuals are ſubject, the clergy became more opulent than the greater part of the nobles. Religious zeal being grown much cooler among theſe, they have looked with a jealous eye on the immenſe poſſeſſions of the monks, oftentimes acquired by the confiſcation of eſtates belonging to their anceſtors. Hence the clergy, inſtead of being ſupported by this body of the ſtate, have, on the contrary, always had enemies among all the nobility. Peter I. ventured to leſſen the power of the eccleſiaſtic body: he aboliſhed the dignity of Patriarch; he did not however deſtroy religion, which he reverenced, nor its influence on the minds of men, by attacking ſuperſtition, and rectifying abuſes. He had formed a deſign of diminiſhing the revenues of the monks, and bringing them back to their firſt inſtitution; and gave out a decree for this purpoſe.

The common people are bigotted even to fanaticiſm in favor of the Greek religion: this extravagance increaſes the farther we get from the capital; but theſe very people are ſo little acquainted with their religion, that they are perſuaded they fulfil all its duties, by complying with ſome external ceremonies,

and

and eſpecially by keeping the Lent faſts with the greateſt ſtrictneſs. In other reſpects, they give themſelves up to debauchery and to every kind of vice. Morality is leſs to be met with among the Ruſſians, than among the Pagans their neighbours. The opinions of the Ruſſians with regard to Chriſtianity are ſo extraordinary, that it ſhould ſeem as if that religion, ſo well adapted in itſelf for the happineſs and good order of ſociety, had only ſerved to make this people more wicked. A murderer being taken and condemned, and being aſked in the courſe of his trial whether he had kept the Lent faſts; appeared as much ſurprized, as the moſt upright man would have been, if his honeſty had been called in queſtion. He immediately anſwered with warmth, that he was incapable of neglecting the duties of his religion. Yet this very man was at the head of a ſet of ruffians, and whenever they ſeized upon any travellers, he readily gave up all the booty to his companions, if they did but deliver him theſe unhappy victims alive. He firſt undreſt them, and tied them naked to a tree, without any regard to their ſex: he then opened their breaſt near the heart, and drank their blood. He declared, that he took great pleaſure in ſeeing the dreadful contorſions and convulſions of theſe wretched people. This fact, though it may ſeem ſcarce credible, was told me by ſome Ruſſians.

Such examples are rarely to be met with in Ruſſia; and I have mentioned this only to ſhew that, in this country, leſs attention has been given to form the manners of the people by religion, than to oblige them to obſerve certain ceremonies, which do not always improve the morals of mankind.

There have been few ſects of the Greek religion in Ruſſia, and this may perhaps be owing to the ignorance of the clergy. The ſect of Razholniki is the only one which has maintained itſelf to this day. M. de Voltaire ſays, it aroſe in the twelfth century. Theſe ſectaries have neither prieſts nor churches: they

they hold their meetings in private houſes. They live together peaceably in their hamlets like brothers. They avoid any intercourſe with the Ruſſians, whoſe bad morals would diſturb their ſociety. They are exceſſively ignorant, and think it a great ſin to repeat *Hallelujah* three times, therefore they only ſay it twice. The biſhops of Ruſſia give the bleſſing with the fore and middle finger; but theſe ſectaries pretend that it ſhould be given only with the three other fingers. They would not allow a prieſt who has drunk brandy to adminiſter baptiſm. Theſe abſurdities, and others of like nature, caracterize the ſect of Razholniki. The cruel perſecutions they have ſuffered from the Ruſſians have made them become ſo violently fanatic, that they think they may be allowed to kill themſelves for the love of Jeſus Chriſt; and indeed, when they are perſecuted, they gather themſelves together in one houſe, to which they ſet fire, and periſh in the flames.

I was aſſured at Tobolſky of the authenticity of theſe facts, related by Mr. Voltaire and Strahlemberg, and was ſurprized that the clergy were not thereby induced to be more mild in the exerciſe of their religion. Meekneſs is every where recommended throughout the goſpel, and our holy religion is neither tyrannical nor cruel: ever conſiſtent with moral and political laws, it teaches us to love our brethren as children of the ſame God, and makes us truly Chriſtians and good members of the ſtate.

Upwards of one hundred thouſand families have been driven from Ruſſia by perſecution, and have taken refuge among the Tartars, who have always been profeſſed enemies to the Ruſſians. The remaining families are ſtill more ſtedfaſt, and reverence thoſe perſons who have periſhed in torments as martyrs. One woman eſpecially, (for fanaticiſm ſeems to be carried to a higher pitch in that ſex) holds the firſt rank among the ſaints of this ſect. Being accuſed of making the ſign of the croſs with

with three fingers, ſhe was condemned to die; and while they were leading her to execution, ſhe continued exhorting people of her perſuaſion, to keep ſtedfaſt in the faith of their fathers: and notwithſtanding the blows they inceſſantly gave her, ſhe was every inſtant lifting her hands up to heaven, and making the ſign of the croſs with three fingers.

The number of ſectaries daily increaſed on account of theſe perſecutions; ſeveral believers abjured their religion, becauſe of the cruelty of the clergy; and ſuch as might have been brought over by a milder treatment, were rather confirmed in their errors, ſo that there never was an inſtance of any one of the Razholniki ſect being converted.

In ſuch circumſtances, the ſovereign ſteps into the aſſiſtance of his faithful ſubjects, as a father to that of his children: religion preſcribes it to him, and the ſafety of his kingdom demands it. Peter I. was thoroughly convinced of this, and gave the moſt expreſs orders, that the Razholniki ſect ſhould not be perſecuted; and by a few examples of ſeverity, made the prelates become true Chriſtians, and good citizens.

After the death of Peter I. the perſecutions began again, under his ſucceſſors. There were ſeveral people in priſon on this account while I was at Tobolſky; from whence they were now and then taken out on great feſtivals, that they might behold the ceremonies of the church, under the vain expectation of their being moved by the ſight.

I ſometimes converſed with the archbiſhop and the abbots of the country on this unfortunate ſect of Razholniki. One day, I aſked one of them in jeſt, whether theſe ſectaries, who would only repeat Hallelujah twice, would go into hell or purgatory, for as to heaven that was ſurely out of the queſtion. His face was inſtantly crimſoned over, and his inflamed eyes beſpoke the nature of his anſwer: we have no purgatory, ſaid he, as in your Romiſh church; they will be irremiſſibly damned.

ned. He could ſay no more, and though in other reſpects he was a good man, and ever inclined to relieve the diſtreſſed, he would have thought perhaps he had done a very meritorious action, if he could have annihilated me that inſtant.

Among the number of Saints in Ruſſia, after Saint Nicolas, Saint Andrew is one of thoſe in whom they place the greateſt confidence. His relics are at Novogorod. The prieſts ſay, that when the Greek and Roman churches ſeparated, this Saint ſet out by ſea from Rome, where he embarked on a mill-ſtone: his oar was a reed, which became petrified the inſtant the mill-ſtone was put in motion. His baggage came after him in a kind of trunk, which alſo floated on the waves: it contained, as the archbiſhop of Tobolſky thinks, ſome ornaments of the church. This great Ruſſian Saint arrived at laſt, after a long voyage, at Novogorod, where his trunk came a few days after him. He then offered ſomething to a fiſherman for the chance of his firſt draught, and the bargain appearing advantageous to the latter he readily agreed to it: but when, inſtead of fiſh which he expected, he ſaw a trunk in the net, he claimed it as his own; and, after many diſputes, the affair was referred to the court of law eſtabliſhed in the place. The Saint, to ſhew that he was in the right, gave an inventory of his effects, which being found, upon opening the trunk, to be a true one, they were given up to him. Saint Andrew fixed his reſidence at Novogorod, where he died, conſidered as a Saint. According to the Ruſſians, his relics, the mill-ſtone, and the trunk, are yet to be ſeen there; where ſince that time, they continue to work miracles: ſo that people come in from all ſides in pilgrimage to this place.

I ſaw an Archimandrite at Paris, who was convinced of the truth of all theſe facts. He would rather have ſubmitted to loſe his beard, than give up the moſt trifling circumſtance of this narrative. I was the more ſurprized at it as he was a

man of good ſenſe; and that he was not the abbot of that monaſtery, where the relics of this pretended ſaint are ſaid to be depoſited. Theſe relics, and others of the like nature in many convents, bring great profits to the monks, to the ſcandal of religion.

I aſked the archbiſhop of Tobolſky an account of the Ruſſian Saints; and he mentioned very few; ſaying, that the bad cuſtom of ſending money to Rome for making Saints was unknown to them: and that Saints were acknowledged in Ruſſia, when the ſynod had pronounced them ſuch, and after the Empreſs had ratified their deciſion. Every time I ſaw this prelate, he choſe to converſe with me about religion, and particularly about the Pope. He thought it very extraordinary that his Holineſs ſhould receive the ſacrament ſeated in an arm-chair. I firſt denied the fact; but when he told me, that a certain Ruſſian had been a witneſs of it at the conſecration of the laſt Pope, to avoid entering into diſputes, which are ever diſagreeable, I aſſured him the Pope was a cripple.

The archbiſhop had as much diſlike to aſtronomy as to the Pope: he was always in a paſſion at the idea of the motion of the earth. He quoted paſſages, which he ſaid were from St. Paul; though I could never find any paſſage in that apoſtle's writings contradicting the motion of the earth round the ſun: I then advanced ſome aſtronomical truths; but, on theſe ſubjects, the prelate was always a heretic.

Although the prieſts of Ruſſia are unfit, from their ignorance, to make proſelytes, yet they have the folly of attempting to convert every body. Being one day at dinner with one of theſe prelates, after having drunk freely, he had a mind to convert my ſervant, who was a Lutheran, and ſerved me in the double capacity of interpreter and cook, though but indifferently in either. As ſoon as the prelate had finiſhed his diſcourſe, the ſervant anſwered him with great anger, that a Lutheran was full

full as good as a ſchiſmatic. The prelate immediately ſnatched up a plate, and would have thrown it at the heretic's head, if I had not interpoſed; telling him at the ſame time, I had never read in ſcripture, that it was cuſtomary among the apoſtles to break people's heads, in order to inſure their ſalvation. I then ſent my ſervant away to dinner, and a few glaſſes of *crematum* ſoon made us good friends again.

The churches are very ill built at Tobolſky, as they are throughout the Ruſſian empire; there are no ſuch beautiful monuments to be found among them, as among different churches in the reſt of Europe. The churches here are, on the contrary, very ſmall, generally rather dark, and badly ornamented. There are indeed many paintings in them, but theſe have neither drawing nor coloring; they are all placed, one above another, againſt the wall of the naos, or body of the church. Four rows of theſe paintings conſtitute all the ornaments of the cathedral at Tobolſky. The choir is in the middle, as it is in moſt of our churches; but with this difference, that all the ceremonies, performed within the choir, are not expoſed to public view. It is a ſacred place, where none but the prieſts enter; the door is generally ſhut, and only opened for a few minutes, either to give the bleſſing, or perform ſome other ſolemn and ſtriking act, or in the great ceremonies exhibited on the outſide of the choir.

On theſe occaſions the archbiſhop is preceded by his clergy, whoſe dreſſes are very grand: their beard and hair looſely flowing, waving the idea of uncleanlineſs, gives them a very reſpectable appearance. They form themſelves, in great order and with the moſt profound ſilence, in a ſemicircle, on each ſide of the door, and ſeem wholly taken up with the ceremony. At length the archbiſhop makes his appearance in the middle of his clergy, with the mitre on his head, and the croſier in his hand. Sometimes he has neither of theſe, but

carries a chandelier, with three branches, in his hand, adorned with wax tapers, or with relics; and gives the bleſſing with the relics or the chandeliers. This ſolemnity of the Greek church, is ſo awful to the people, that if there ſhould be the leaſt diſturbance, as there is frequently in the Romiſh churches, all is huſhed as ſoon as the doors are open; and the aſſembly waits with the deepeſt veneration for the ſight they but ſeldom enjoy.

The ceremonial dreſſes are extremely grand, but inconvenient; the cope, inſtead of being open before, as it is in the Romiſh church, has but one ſingle opening to let the head through, and the forepart of this garment is turned up over the arms.

The abbots have mitres ſimilar to thoſe of the biſhops; but they differ much from the mitres of our prelates. The beſt idea that can be given of them is, to compare them to a bee-hive; they are covered with ornaments and jewels, which are commonly falſe.

The dreſſes of the Greek church, having been publiſhed by *M. Le Prince*, I thought it needleſs to give any freſh engravings of them; I therefore refer ſuch of my readers, as may be deſirous of knowing ſomething more of theſe dreſſes, to that gentleman's repreſentation of them, from whence a better notion may be gathered, than from any deſcription I could give.

In the public ceremonies of the Greek church, the holy worſhip conſiſts chiefly in action. Theſe actions have a great effect on the people, but become ridiculous in the narrative.

I have ſeen the ceremony of the holy ſupper. St. Peter was repreſented by a fat well-looking monk, but who was perhaps little accuſtomed to theſe ceremonies, as he ſeemed aukward and fooliſh. The archbiſhop, on the contrary, had a free, eaſy countenance, and a ſprightlineſs very expreſſive of his zeal.

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Having waſhed the feet of eleven monks, he then addreſſed himſelf to St. Peter: immediately a great diſpute aroſe, which could not be heard, becauſe the prelate had, at one of his ſleeves, a ſquare piece of ſtuff ſurrounded with bells, which made a great noiſe: but it might eaſily be perceived from the confuſion and dejected look of the monk who repreſented Saint Peter, that he was not fond of diſputes: he was at laſt completely diſconcerted, by the byſtanders burſting out a laughing; ſo that, in order to put a ſtop to this, they were obliged to waſh his feet quickly. The archbiſhop gave a diſcourſe on humility, and then went away.

In the Greek church, children of five or ſix months are brought to the communion table. I ſaw an inſtance of this at Tobolſky; a little child was waked out of his ſleep for this act of devotion; he gave them to underſtand, by crying, that he had much rather have been excuſed; notwithſtanding his tears, they made him partake of the ſacrament; but, he could not be quieted till he was put to the breaſt.

Eaſter-day is ſet apart for viſiting in Ruſſia, as the new-year's day is in France. I affronted ſome people, very unwittingly, for want of knowing the cuſtoms of the country.

Being intent upon ſome aſtronomical calculations in the morning, I did not perceive a Ruſſian come into my room. Unwilling, as I ſuppoſe, to diſturb me, he had placed himſelf near me, unfortunately for us both; for ſtarting up quickly to walk about the room, we ſtruck each other ſo forcibly, that he fell backwards on the floor, and I upon a trunk. Although I was equally ſtunned with the accident, and ſurprized at ſeeing a ſtranger in my apartment, yet I went up to make him my excuſes. I ſtretched out my hand, deſiring him to be ſeated: he then offered me his hand, and gave me at the ſame time an egg. I was aſtoniſhed at this, not having yet recovered the ſhock my head had received. Beſides, I was quite at a loſs what

to anſwer him, for he talked to me all the while as if I had underſtood his language. I was continually bowing, and endeavouring to convince him by ſigns with my head, as with my hands and feet, how much I was obliged to him for all his civilities, till at length he went away ſeemingly much diſpleaſed. I was preparing to go to work again, when another Ruſſian came in; who appeared evidently, from the unſteadineſs of his gait, not to be faſting: he advanced to embrace me, but as he ſmelt powerfully of brandy, I endeavoured to keep myſelf out of the way of his mouth, but it was impoſſible to avoid it. This man alſo gave me an egg; and I then began to find out enough of this ceremony, to give him in return the egg I had juſt received; notwithſtanding which he ſtill ſeemed diſſatisfied when he left me.

As to myſelf, I was ſo little pleaſed with theſe two viſits, that I ſhut my door inſtantly, leſt I ſhould have a third: I faſtened it with two nails, one at top, the other at bottom, as I had no bolt.

A few hours after I learnt that this was, as I ſaid before, the uſual viſiting day. The men go to each other's houſes in the morning, and introduce themſelves into the houſe by ſaying, *Jeſus Chriſt is riſen:* the anſwer is, *Yes, he is riſen.* The people then embrace, give each other eggs, and drink a great deal of brandy. As I had not complied with all theſe cuſtoms, I then found out why the Ruſſian, who had viſited me in the morning, had been diſpleaſed. I was the more ſorry for it, as I could eaſily have ſatisfied them with a few glaſſes of brandy: beſides, I was particularly attentive in complying with the cuſtoms of the country, without which precaution a man makes himſelf diſagreeable to every body.

The afternoon is employed in viſiting the women, who alſo go a viſiting themſelves: they are generally accompanied by the men; and they enjoy this pleaſure of going out, very

much, as they are much confined at other times; the men indulge themſelves in drinking the whole day. The room, where the viſitors are received, is ſet out with all their finery. There is a kind of ſideboard, raiſed in form of an altar, at the end of the apartment, where all the riches of the family, plates, diſhes, knives and forks, bottles, glaſſes, candleſticks, &c. are ſet out upon ſeveral brackets, and placed in the niceſt order. In the middle of the room is a table, covered with a carpet, which is garniſhed with Chineſe ſweetmeats, and a ſpecies of raſberries of this country, dried in the ſun. On coming into the apartment, all the people place themſelves, ſtanding all along the benches which ſurround the table, the women firſt, and the men after them. Then the miſtreſs of the houſe, with the utmoſt gravity, and without ſaying a word, kiſſes all the company round. When this ceremony is over, the men retire into another apartment, and the women are left by themſelves in the firſt. There is alſo a table ſpread, with a carpet and ſweetmeats, in the room where the men are.

The maſter of the houſe entertains his gueſts in this room, while his wife takes upon her the ſame office in the other. Some travellers have aſſerted, that the women of this country drink ſtrong liquors to exceſs; but I have never found this. Coffee is ſerved up to them, with a kind of bad beer, and ſome tea; and they ſeem to drink of theſe liquors, more from complaiſance to the miſtreſs of the houſe, than by choice. It is not ſo with the men, who are almoſt all drunk after three or four viſits; for as ſoon as the company is ſeated, the maſter of the houſe brings in a kind of waiter, with glaſſes full of brandy, or other liquors of the like nature. He offers ſome to each gueſt, and it would be a great affront not to drink with him. After this a ſort of mead is ſerved up, ſome coffee, and between whiles ſome brandy. One muſt abſolutely partake

take of all theſe liquors, and eat a few ſweetmeats. The viſit generally laſts half an hour, after which the men go back to the women's apartment; where, having been again ſaluted, the company goes altogether in a viſit to the next neighbour. Thus the whole day is ſpent going about the town and drinking. After two viſits were over, I was ſeized with ſuch a violent pain in my head, that I was obliged to retire. I found myſelf ſtill ſo much indiſpoſed next day, that although I was very deſirous of continuing my viſits with thoſe perſons, who did me the honor to aſk me, yet I ſhould have given it up, had I not been aſſured, that I might be excuſed from drinking by ſtaying among the women: but I perceived even at the firſt viſit, that this was by no means agreeable to the men. A Ruſſian, to whom I have often been obliged for his advice, confirmed me in this conjecture, ſo that I returned to the mens table, taking care to provide myſelf with a number of handkerchiefs, which were of great ſervice to me. As ſoon as I had taken my glaſs of brandy, I emptied it into my handkerchief, on pretence of wiping my mouth; and, by this contrivance, viſited the whole day without ſuffering any inconvenience. Theſe viſits generally laſt three days.

I obſerved, during the holy week, that it was very eaſy for the rich people in Ruſſia, to acquit themſelves of the duty of cuſtomary prayers. The prieſts go about into their houſes, with the ornaments of the church, and every thing neceſſary for the divine ſervice, adapted to the ſeaſon; there they perform the ſervice for a trifle, while the Ruſſians are in bed, or in their other apartments.

Deſcription

Deſcription of the city of Tobolſky, of its inhabitants, and of the manners and cuſtoms of the Ruſſians, &c.

SIBERIA was made known to the Ruſſians in 1563, by a private man in the neighbourhood of Archangel, whoſe name was Anika; and afterwards conquered by the chief of a band of ruffians, under the reign of John Baſilides. It was then governed by a Tartar prince of the family of the Uſbecs. This banditto, named Termack Timofeiwitz, at the head of ſeven or eight hundred Coſſacs, ravaged all the country about the rivers Occa, and Volga.

The Czar Baſilides ſent a body of troops againſt this chief of the Coſſacs; they obliged him to retire into the mountains that divide Ruſſia from Siberia, called Poias Zemnoy, or the Poias mountains. He croſſed this chain, going up the river Czauſowa, and fell back upon the territories of M. Strogonof, whoſe deſcendents have ſtill very conſiderable poſſeſſions in this diſtrict *.

This chief, at the head of a ſet of reſolute banditti, eaſily obtained of M. Strogonof all the aſſiſtances he required. He embarked with his company on the Tagil, and went down that river to the place where it empties itſelf in the Tura. Purſuing the ſame courſe on this river, he ſeized upon the city of Tumen, ſurprized Tobolſky, made priſoner the ſon of the Chan Zutchuin, a boy twelve years old, and ſent him to Moſco, with the offer of Siberia to the Czar of Ruſſia, by which he obtained his pardon.

Tobolſky, the capital of Siberia, was built on the ſide of the old city which was then called Sibir. It contains about fifteen

* It appears that he went up this river, as far as the confines of Bilimbaeuſkoi.

thouſand inhabitants, almoſt all Ruſſians, or naturalized. Of the latter there are ſeveral Mahometan Tartars; the greater part of them live without the city, that they may perform with leſs interruption the ceremonies of their own religion.

The town is divided into two parts: the larger part is ſituated on the banks of the Irtyſz; and the other upon a ſmall mountain, the ſummit of which is a platform extending to the eaſt of Tobolſky. The height of this mountain is about 25 toiſes above the river. The upper town is fortified, eaſtward and northward, by a rampart, baſtions, and a ditch of ſix feet in breadth, bordered with paliſadoes. All the fortifications are on the flat: the other parts of the city are from ſituation difficult of acceſs; the ſouthern part, on account of a deep gorge, the ſides of which are very ſteep; the weſtern part, becauſe the Irtyſz flows at the foot of the mountain, which being compoſed of a very looſe ſand, cannot be ſcaled without great danger. Vaſt pieces are continually breaking from the mountain, fall into the river, and carry away every thing they meet. I have been an eye-witneſs of an accident of this kind. I was coming from a party of pleaſure, where I had been in a boat with Mr. Pouſkin, his lady, and ſome other perſons. We went up the mountain by a path leading to Mr. Pouſkin's houſe. We had ſcarce advanced a few ſteps, when we heard ſuch a violent craſh to the right-hand, that we were frightened. All the inconvenience we found, was being obliged to get up faſter than we had intended.

The town has a governor, whoſe authority extends almoſt all over Siberia; and a court of chancery compoſed of fifteen counſellors, who regulate affairs as well civil as military. The governor is the preſident, and decides commonly with ſovereign authority. This place being at the diſtance of near eight hundred leagues from the court, true accounts are ſeldom tranſmitted from hence to the throne; ſo that the gover-

nors

nors almoſt always abuſe their power, from the opportunity they have of doing it with eaſe.

In order to counterbalance this authority, Peter I. created a new office. The perſon inveſted with it, is called a Proctor: he is not dependent on the governor or the chancery: he ranks next to the governor, and part of the buſineſs adjudged by the chancery, or by the governor, cannot be finally determined without the ſanction of the proctor. This important poſt was at that time filled by count Apollo Pouſkin: a perſon as fit for the office as any one who could have been pitched upon. This miniſter poſſeſſes the moſt enlightened underſtanding, warmed with the love of truth and humanity.

As he is directed by the greateſt zeal and diſintereſted affection, it is in his power to procure his country the moſt eſſential advantages. He was kind enough to offer me a lodging at his houſe, and preſſed me ſo much, I could not refuſe him. Every inſtant I remained at Tobolſky, gave me freſh proofs of the obligations I had to him.

He had come to Tobolſky two months before me: where he lived with his lady in a retired manner, entirely taken up with the duties of his ſtation, and with the cultivation of literature, which he had ever been fond of. Being verſed in the French language, he had brought with him from Moſco, a ſelect library, conſiſting of the works of our beſt writers. He had an improved mind, joined to an uncommon politeneſs, and gentleneſs of manners. Free from national prejudice, he could not conſider his wife as a ſlave: ſhe was his beſt friend; and by the goodneſs of her heart, contributed to her huſband's happineſs.

M. de Soimanof, was governor of Siberia, he had ſerved in the navy in the reign of Peter I. and had acquired much aſtronomical knowledge, at St. Peterſburg, with M. Deliſle, of the Academy of Sciences. M. de Soimanof's abilities afterwards induced Peter I. to give him the command of a fleet on

the Caſpian ſea. At the ſame time he was ordered to take the plan of this ſpot, and it is to him we owe the firſt accurate chart of that ſea. After the death of Peter I. he was much perſecuted by his enemies, who found means to have him baniſhed. He was recalled; and, after various changes, the Czarina Elizabeth gave him the government of Siberia. As he had lived long at court, he was well acquainted with all its artifices. Although he was naturally a ſincere man, the changes of his fortune had made him miſtruſtful and diſſembling. His ſuperior underſtanding made his enemies fear him: he was bold, enterprizing, capable of planning the greateſt deſigns, and of carrying them into execution, had he been leſs advanced in years. It was an unlucky circumſtance for me, that he could not ſpeak French. It was evident to me, on many occaſions, that I loſt a great deal by not being able to hold a converſation with him, without my interpreter.

At Tolboſky, there is an archbiſhop, whoſe dioceſe extends over the greater part of Siberia. The prelate who then filled that ſee, was a native of Poland. He was not a man of great knowledge; but was perfectly well acquainted with the Latin tongue, and with the ſcriptures. His religious zeal was carried to the higheſt exceſs of fanaticiſm. He conſtantly perſecuted the Mahometans and Pagans in the confines of Tobolſky, in order to convert them to the Greek religion: in other reſpects he was an exceeding well-bred, and very amiable man.

Beſides theſe principal officers, there was alſo the Grand General at Tobolſky, whoſe rank in the army was very high. He was a weak man, and ſuperſtitious; believing, as well as the common people, that the overflowing of the Irtyſh was cauſed by my arrival in the country; and that this ſtream would not ſink into its channel again, till after I was gone.

All the counſellors of the chancery, and ſeveral merchants, live in a very reputable manner at Tobolſky. The garriſon, conſiſting

conſiſting of two regiments of infantry, brings a great number of officers there, who are entirely engaged in purſuit of pleaſure.

The clergy is compoſed of fifty monks, and twenty prieſts; three of this number, including the archbiſhop, are ſuppoſed to underſtand the Latin language.

Theſe ſeveral ſtates of the military, of juridical people, of the clergy, and of merchants, might form very agreeable ſocieties any where elſe: eſpecially as moſt perſons employed under the government are ſent there from St. Peterſburg, and from Moſco.

At the diſtance of about an Engliſh mile, the city of Tobolsky preſents a beautiful view; this is owing to its ſituation, and the number of ſmall ſteeples it contains, moſt of which are covered with braſs. But we loſe this ſight upon our entrance into the town; as the houſes are all of wood, and ill-built: the governor's houſe, the chancery, the archbiſhop's palace, the town-hall, and a kind of citadel, are the only buildings built with bricks and ſtones.

It is ſcarce poſſible to walk along the ſtreets in this city, on account of the quantity of dirt there is even in the upper town, except in ſome part of the ſummer. To obviate this inconvenience, there have been foot-ways made by planks in ſome ſtreets, which is the general cuſtom in Ruſſia; but they are kept in ſuch bad repair at Tobolsky, that you can hardly venture out except in carriages, which are indeed pretty common here, becauſe wood, horſes and their keep, are all at a very low price.

The men in Siberia are tall, ſtout, and well made, as they are almoſt all over Ruſſia: they are exceſſively fond of women and drinking. As they are ſlaves to a deſpotic prince, they exert the ſame abſolute authority over their ſlaves or inferiors, with ſtill greater ſeverity.

The

The women are in general handſome at Tobolsky: their skin is exceedingly fair, and their countenance agreeable; their eyes are black, languiſhing and down-caſt; for they never dare look a man full in the face: they wear no caps, but uſe colored handkerchiefs, which they interweave ſo curiouſly among their hair, generally black and unpowdered, that this kind of head-dreſs gives them a very bewitching look. They all uſe paint, young girls as well as married women; and this cuſtom prevails even among the ſervant maids, and ſome of the common people.

The women are commonly well-made till the age of eighteen or twenty; but their legs as well as their feet are always large. Nature in this reſpect ſeems to have had in view the bulk they uſually acquire; which ſeems to want very firm ſupporters.

The baths, they uſe twice a week, contribute chiefly to ſpoil their ſhapes: they cauſe ſuch a relaxation in all the parts of the body, that the beauty of the women is quite gone before they are thirty years of age.

Their dreſs at preſent is very much like that which is in uſe throughout Europe. The mens dreſs is exactly the ſame at Tobolsky, and all over Ruſſia. Some merchants, the noblemen's ſtewards, and the common men are almoſt the only perſons who have kept to the old dreſs, as well as to the cuſtom of wearing the beard. I ſaw only a few gentlemen at Tobolsky, who had been diſgraced, ſtill conforming to theſe old cuſtoms, which they certainly had lately taken up again. The dreſs of the women at Tobolsky (I except the head-dreſs) differs from that uſed in Europe, only in our peculiar faſhions, with which they are unacquainted; they generally wear a looſe gown like a domino. On public days, their gowns are much like the robes formerly worn in France. This dreſs came from St. Peterſburg to Tobolſky.

The

The men, as well as the women, are generally richly dreſſed: they get their ſtuffs and ſilks from Moſco, and ſometimes from China; but at Tobolſky, as throughout Ruſſia, both the ſexes are very uncleanly, notwithſtanding the baths they uſe twice a week. The women change their linen but ſeldom; and are unacquainted with that variety of undreſs, to which the Europeans are accuſtomed; and which is often more betwitching than the richeſt ornaments: ſo that there are few opportunities of being preſent at the toilet of the Ruſſian women.

In the houſes of people of the firſt rank at Tobolsky, as in moſt other parts of Ruſſia, there is but one bed for the huſband and wife, and ſometimes one for the children: all other perſons in the houſe lie promiſcuouſly upon benches or upon matts, which they ſpread on the ground, in the different apartments *. There are no curtains to the beds; and inſtead of a bolſter, the huſband and wife have each of them ſeven or eight pillows, one leſs than the other, raiſed up in form of two pyramids. This bed is generally the principal piece of furniture. Sometimes there are at Tobolſky in bedrooms, ſome wooden chairs, a large ſtove, and a ſmall table.

In the whole city of Tobolsky, there was not a ſingle houſe that had any carpeting in it; ſome beams placed one upon another, but made ſmoother than common, ſome benches and a few wooden chairs, made up all the furniture of their apartments.

At Tobolsky men are very jealous of their wives, as they are throughout the greater part of Ruſſia: beyond the city of Moſco, however, they are ſeldom in company with them; ſpending moſt of the day in drinking, and generally coming

* In 1663, the people of quality uſed to lie upon boards or benches, on which a ſkin or other covering was ſpread: there was no furniture in the houſes; and very few tables were covered with a cloth at meals. M. de Voltaire, hiſtoire de la Ruſſie, tom. i. pag. 20.

home drunk. The women ſeldom go out; they live wholly ſequeſtered from ſociety, given up to lazineſs and indolence, which are the cauſes of the depravity of their manners.

That kind of delicate love which proceeds from ſenſibility, and againſt which the ſevereſt virtue cannot always guard itſelf, is here totally unknown.

Here a lover never has the ſatisfaction of ſeeing the confuſion and diſorder of his miſtreſs, endeavouring, but unable, to conceal her tenderneſs. Such ſituations are never met with in Siberia, nor in the greateſt part of Ruſſia, where the poliſhed manners of the reſt of Europe have not yet prevailed. In theſe barbarous regions, men tyrannize over their wives, whom they conſider and treat as their ſlaves, requiring of them the moſt ſervile offices: in their matrimonial engagements they are obliged to bring them a handful of rods, in great ceremony, and to pull off their boots, as a token of the ſuperiority of the huſband, and the ſubjection of the wife. Availing themſelves more than any where elſe of their ſuperior power, they have eſtabliſhed the moſt unjuſt laws, which neither the beauty nor delicacy of the ſex have yet been able to aboliſh or ſoften. We are not therefore to be ſurprized, that that delicacy of ſentiment which caracterizes the people of more civilized nations, is ſo rarely to be met with here. If ſuch women are worth the attempt, boldneſs is often ſufficient to inſure ſucceſs; but opportunities of this kind ſeldom occur, as women are ſcarce ever ſeen, but when their huſbands are preſent; and if the leaſt attention is ſhewn them on theſe occaſions, it is very probable one may not ſee them a ſecond time.

I ſaw ſome foreigners at Tobolsky, who had been there ever ſince the beginning of the laſt war; unacquainted with the cuſtoms of the country, they often experienced diſagreeable conſequences, from the idea that women were to be treated with the ſame politeneſs and attention here, as in the reſt of Europe.

Europe. They afterwards became more cautious, being convinced of the neceſſity of taking no notice of the ladies before their huſbands; and joining in with the convivial pleaſures of the latter, ſoon found means of being admitted to greater familiarities with their wives in private. Thus the depravity of the ſex in Ruſſia is owing to the tyranny of the men.

The women are captivated merely by ſenſual pleaſures, often giving themſelves up to their ſlaves; among which they take care to chuſe ſuch as are moſt healthy and robuſt.

The manners of this people will never be improved, while the women are kept in a ſtate of ſlavery, and do not partake of the pleaſures of ſociety. Although the men are remarkably ſevere to their wives, yet are they very indulgent to their daughters. They think that married women ſhould be entirely taken up with their huſbands, but that greater liberty may be allowed to the unmarried, thereby to give them opportunities of getting huſbands: they very ſoon avail themſelves of this freedom, without the conſent of their parents, or the ſanction of the church. At twelve or thirteen years, they are frequently no ſtrangers to the other ſex; but ſuch is the inconſiſtency of this people, that they expect their daughters ſhould ſtill be virtuous, while they allow them ſuch liberty, as ought ever to be regulated by a good education; they alſo pretend to determine with an abſolute certainty, whether their daughters are ſtill virgins; this is done by a jury of ſkilful women, who determine this matter by entering into the ſtricteſt examination, which, in other countries, would be conſidered as very indecent.

On the day appointed for the marriage ceremony, after the parties have been joined by a prieſt, as in our church, the lady's parents give an elegant ſupper, at which the huſband's family is preſent, ſome friends, and a magician, who comes with an intent to counteract the witchcraft which might be

practiſed by other magicians, to prevent the conſummation of the marriage. The new-married couple, attended by a godfather and a godmother, are conducted with the greateſt ceremony into the nuptial chamber before ſupper.

The magician walks firſt, the godfather follows, conducting the bride: the bridegroom gives his hand to the godmother, and the brideſman his to the huſband's neareſt female relation, who is one of the jury, which is generally compoſed of three or four women. During this proceſſion to the nuptial apartment, every thing is got ready for the feaſt in the room where the company ſtays; who wait only the return of the married couple to begin their mirth; being thoroughly perſuaded, that the deciſion of the jury will be favorable to the bride.

The marriage chamber contains in general nothing but a bed, which is uſually very neat, and without curtains; the images given by the godfather and godmother to the married couple; a few chairs, and a table, with bottles of brandy, and glaſſes, near which an old matron is placed.

The proceſſion having reached the marriage chamber, the matron offers the bride a waiter, on which are glaſſes filled with brandy and other liquors: the bride then preſents them to the magician firſt, and afterwards to the whole company round; the magician prepares his magic art; the bride is then undreſſed, and left with a ſmall petticoat and an under-waiſtcoat only; both of them made on purpoſe for this day, which is conſecrated to voluptuouſneſs. The bridegroom is alſo undreſſed, and a nightgown thrown over him: the bride then kiſſes all the company round, offers them again a glaſs of brandy; and when every body has drank a ſecond time, they retire into an antichamber, leaving the married couple alone with the matron, who aſſiſts at the ceremony; in which ſhe is the more intereſted, as ſhe receives a reward if the lady is acknowledged to be a virgin; whereas ſhe is obliged, if the contrary happens,

to

to drink out of a broken glaſs, in the midſt of the company, which is conſidered as a mark of ignominy.

After conſummation, the jury of women is called in, who ſtrip the bride quite naked, in order to decide whether ſhe was a virgin. Among other proofs required upon this occaſion, the inſpection of the linen is what they moſt depend upon, and when this anſwers to their wiſhes, the ſhift is placed in a box; they give the bride a clean one, dreſs her, and then call in the magician, the godfather, and the brideſman. The matron, triumphant, gives the waiter again to the bride, who offers another glaſs of brandy to all the people of the proceſſion. The married couple are then led back to the company: the box containing the proof of the lady's virginity is carried firſt; and upon the appearance of that, the muſic announces the triumph of the new-married couple. While the muſic is playing, the ſigns of the bride's virginity are ſhewn to each of the gueſts, and for ſeveral days after the box is carried round among all the neighbours. When all the company is perfectly ſatisfied, the lady dances for a few minutes with her huſband, and every body ſits quickly down to the table, where moſt of the men commonly get drunk.

There were ſeveral marriages while I ſtayed at Tobolſky; but I could never get any admiſſion to any of the feaſts; one lady in particular, otherwiſe a very amiable woman, was always againſt it; ſaying, ſhe was afraid I ſhould think their ceremony ridiculous, and give an account of it to the public. In my way from Tobolſky back again to St. Peterſburg, I was invited to a wedding, and appointed brideſman, ſo that I had then an opportunity of ſeeing the whole tranſaction.

In the beginning of the reign of Peter I. the Ruſſians uſed to marry without having ſeen each other. The parents on the man's ſide uſed to ſend a kind of matron to the girl's parents: the matron then told them; *I know you have goods to diſpoſe of, and*

we have purchaſers. After ſome inquiries, and a few days ſpent in negociating the affair, the parents uſed to meet. If the lad was agreeable to the girl's parents, the day of the ceremony was fixed. The evening before marriage, the young man was brought to ſee his deſtined wife, who received him without ſpeaking a word: one of her relations was engaged to converſe with him. The next day, the lad uſed to ſend a preſent to the lady, conſiſting of ſweetmeats, ſoap, and other things of the ſame kind. The box was never opened but in preſence of her friends, who were immediately ſent for: ſhe then uſed to lock herſelf up with them, continually ſhedding tears while her friends were ſinging ſongs ſuitable to the occaſion of her marriage.

There are no traces of theſe laſt cuſtoms remaining, except among the common people. European manners, which Peter I. endeavoured to introduce in his dominions, have aboliſhed ſome of the ancient prejudices. From this period, marriages have been upon a different footing. Among the great, parents are influenced by fortune and high rank; and children, as it is the cuſtom every where elſe, are ſeldom conſulted.

European manners, however, have gained very little ground in Ruſſia; becauſe they are not conformable to the deſpotiſm of the government: they have nevertheleſs introduced luxury, and brought on a communication between Ruſſians and foreigners; which has only contributed to make the Ruſſians more unhappy, by giving them opportunity of comparing their ſtate of ſlavery, with that of a free people.

As I have ſeen the Ruſſians at the diſtance of eight hundred leagues from court, I have been enabled to acquire a competent knowledge of this people.

Upon the whole, there is very little ſociety in Ruſſia, eſpecially beyond Moſco: neither is it poſſible there ſhould be much, under a government where no man enjoys that civil liberty,

liberty, by which the ſafety of the citizen, in other countries, is ſecured. A mutual fear prevails among individuals; from hence ariſes miſtruſt, diſguiſe, and deceit. Friendſhip, that ſentiment which contributes to the happineſs of our lives, has never been known in Ruſſia; it ſuppoſes a ſenſibility which makes an abſolute union of the two friends, and effuſions of the heart, which divide their pleaſures and pains reciprocally. As the men have but little reſpect for the women beyond Moſco, they are not attended to in company, although company is nothing without them. They are almoſt always confined to their houſes; where they paſs their tedious days among their ſlaves, without authority and without employment; they do not even enjoy the ſatisfaction of reading, for moſt of them know not how to read. The men are as ignorant as the women. They viſit now and then with great ceremony: the governors and chief magiſtrates give grand dinners ſeveral times in a year. Relations alſo meet now and then, to keep the feaſt of their family ſaint; but they ſeldom admit any perſon at theſe feaſts, who is not one of the family. At the great entertainments, both men and women are invited together, but they neither ſit at the ſame table, nor in the ſame room. The miſtreſs of the houſe does not appear in the mens apartments, till they are juſt ſitting down to dinner; ſhe brings in with her a large waiter covered with glaſſes full of brandy; which ſhe preſents, in a very ſubmiſſive manner, to all the gueſts, who do not even look at her; the glaſſes are returned to her, and ſhe withdraws immediately.

There are always a great number of people at theſe feaſts; to which perſons of all ſtations are invited. Officers, clergy, magiſtrates, and merchants, are all placed at the ſame table; but with this difference, that rank is more ſtrictly attended to, than in any German court. Military men are placed according to their ſeveral ranks; and perſons of other profeſſions are diſpoſed in the ſame manner: no regard is paid to birth.

All the diſhes are ſerved up at once. Their ſoup is made by cutting the meat into ſmall pieces in the broth. They have ſome ragouts, which nobody who is not uſed to can eat of. The table is generally covered with ſeveral pyramids of roaſt meat; moſt of them compoſed of different kinds of game, the reſt of butchers meat. Chineſe ſweetmeats are ſerved up at the ſame time, and ſome made of the fruits of the country.

Their manner of ſitting at table, and their cuſtoms, ſeem to be very ſimilar to thoſe which prevail in ſome diſtricts of Germany; but they have adopted only the ridiculous parts of them, which they have even rendered ſtill more ridiculous. A profound ſilence is obſerved during dinner; which is interrupted only at times by the healths that are drunk.

As ſoon as they ſit down to table, each man pours into his glaſs ſome of the made-wine I have mentioned before; and then all riſe to drink each others health. Each gueſt is drunk to by his chriſtian and ſurname; and a drop of wine is ſwallowed to each perſon's health.

I have been at ſome of theſe dinners, where there were more than ſixty people, all drinking to each other at the ſame time. Their attitudes, and the confuſion of different ſounds had a very ſingular effect. Peter not being able to make James hear him, was ſtretching himſelf over the table, and bawling out as loud as he could; at the ſame inſtant, he was interrupted by Francis, who was bowing to him, or by a knock of the head from Philip, who was turning about from right to left without perceiving the poſture Peter was in. Philip's turn came next: as he was lifting his glaſs to his mouth, his neighbour gave him a jog of the elbow, and ſpilling part of his wine, interrupted him at the moſt intereſting moment. Such ſcenes as theſe, varied in different ways, were repeated almoſt at every part of the table; and the pleaſantry of them was enhanced, by obſerving the impatience of ſome of the people. As to my-

ſelf, I could never find an opportunity of drinking any one's health; but kept my head in conſtant motion, to the right and left, and forwards. It is reckoned a qualification to catch the opportunity ſo ſeaſonably as to drink to every perſon's health, without deſcending from one's dignity, or meeting with any accident.

The firſt health being over, every body ſits down, and is at liberty to eat for a few moments. Glaſs tumblers of a cylindrical form, ſix inches high, and four wide, are placed in different parts of the table. Every gueſt within reach of one of theſe tumblers, takes it up and drinks out of it: it would be thought very unpolite, if he was to take a glaſs, in order to avoid drinking out of the ſame tumbler as his neighbour. This cuſtom is not only diſagreeable, but at the ſame time very dangerous, on account of the ſcurvy, which is extremely frequent in Ruſſia.

When the company has eat for a few minutes, the Emperor's health goes round. This toaſt is given in a different manner. A large glaſs bottle, to which there is alſo a glaſs top, is placed on the table before the perſon of the higheſt rank. This perſon riſes from his ſeat, as well as his right-hand neighbour, to whom he gives the head of the bottle, and pouring ſome wine into the cup, gives out the Emperor's health, bowing to the whole company. As ſoon as he has drunk, he gives the bottle to his neighbour, who paſſes the top to the perſon ſitting next to him. All the company drinks the Emperor's health in the ſame manner, while a band of muſicians is employed in ſinging ſongs adapted to the ceremony.

The healths of the princes and princeſſes of the royal family are then drunk in the ſame order, and eating goes on for a little time longer.

The

The healths of all the gueſts are then carried round, with another glaſs bottle, which is not ſo beautiful as the firſt, and is covered with a cruſt of bread.

This toaſt goes round nearly in the ſame way as the former, except that when the lid of the bottle is given to one's neighbour, it is uſual at the ſame time to tell him the chriſtian and ſurname of the perſon whoſe health is going round; and this muſt be repeated making a bow to him: this cuſtom is very troubleſome to ſtrangers, as the Ruſſians have generally three or four chriſtian names. This ceremony is carried on with the utmoſt gravity, and one muſt be very exact in the whole detail, which extends all round the table. However deſirous I was of being exact, yet I was always puzzled when the toaſt came to me. I uſed to forget the number of ſaints named to me, moſt of which were never inrolled in our liſt. I was however very much mortified at this. Beſides, I had uſually for my neighbour a Ruſſian, who was a very ſtrict obſerver of rules; he had acquired by his exactneſs a right of preſiding over the police of the table, and was very much out of temper, whenever any one was deficient in this point. This gentleman was ſo obliging as to ſet me right frequently; but on one occaſion he was as much puzzled as myſelf, when two cruſts of bread were preſented to me from each ſide, one of which had fell ſeveral times, contrary to order, into the plates, and into the bottle. Not knowing whom I was to anſwer, nor what I was to do with theſe two cruſts, I referred the whole affair to him, and ſat down. He was informed, that, the company conſiſting of ſixty gueſts, a ſecond bottle had been called for, to haſten the ceremony; but he decided, that it was better to be detained two hours longer at table, than to neglect any of the uſual forms.

At laſt, the company roſe from table, and went into another room. I imagined at firſt, that the dinner was over, and that

that we were now to drink coffee; but was much ſurprized at the ſight of a table covered with Chineſe ſweetmeats. Four ſervants waited for the company, with bottles of mead, beer, and different liquors made with brandy. Others brought in waiters with glaſſes. The company then ſet in for drinking again; and from this time ceremony was at an end. The Ruſſians, though accuſtomed to this manner of living, ſeldom bear the quantity of liquors drank after dinner, which are not only very ſtrong, but the drinking is alſo inceſſantly continued till the evening. If the company chuſes to take a walk, the bottles and glaſſes are carried along with them; and this is looked upon as doing the honors completely.

Some travellers aſſert, that the women as well as the men give themſelves up to all the exceſſes of drinking; but I have always ſeen the contrary. The women, after dinner, remain in the ſame room, growing tired of one another; for it is impoſſible it ſhould be otherwiſe, where thirty women meet together without one man.

The inhabitants are much delighted with receiving viſits; viſiting is called *going in gaſt*. As ſoon as the company comes in, the miſtreſs of the houſe appears with her huſband, and kiſſes them all on the mouth. She is often an old woman of ſeventy, who comes in hobbling along, with a ſhaking head, and ſome remains of a few rotten teeth; but whether ſhe is young or old, ugly or handſome, the ceremony is ſtill the ſame; and it would be a crime, let what would happen, to ſhew any ſigns of mirth upon theſe occaſions. I knew a gentlemen in Siberia, who would ſometimes come forward to meet the ladies at theſe viſits, and, inſtead of appearing ſolemn as he ought to have done, would put on a ſmiling countenance. One of his friends informed him, he behaved very rudely to the ladies, who did not however find fault; and

very improperly to the men, who were much diſpleaſed with him.

When this firſt ceremony is over, the miſtreſs of the houſe withdraws. She returns ſoon after, with a waiter and glaſſes full of liquors: every body riſes, ſhe offers them the liquors; the company bow to one another, drink, eat for ſome time, and then go away. The men ſometimes converſe between whiles, but the women never join in the converſation. If a ſtranger comes in, he invites the company to his houſe, who always comply with the invitation. They do not leave him, till they have drunk plentifully, and go from thence to drink with another neighbour. The whole afternoon is thus ſpent in viſiting, and every man generally goes home drunk.

There is no other kind of ſocial amuſement in uſe throughout the whole nation from Moſco to Tobolſky; they dance ſometimes, but that is very rare, except at weddings.

It is about fifty years ſince the women at Moſco and St. Peterſburg have ſhaken off the yoke of ſlavery, to which they were ſubjected by their huſbands. Before that time, they lived, and were treated in the ſame way as in other parts of Ruſſia. If the manners have not been much bettered from this change, it is owing to their exceſſive depravity, before it took place. Throughout Ruſſia in general, a man has much to anſwer for, if he is but agreeable.

Moſco appeared to me preferable, in many reſpects, to St. Peterſburg. The city of Moſco not being more than two hundred ſhort leagues diſtant from St. Peterſburg, the governors are too near the ſovereign, to be tyrannical; and the inhabitants far enough from the ſeat of government, not to be afraid of the ſcaffold for ſlight indiſcretions of ſociety *.

Pleaſure

* M. de Monteſquieu obſerves, in the 12th chapter of his 12th book, wherein he treats of indiſcreet words that, in the manifeſto publiſhed by the late Czarina, againſt

Pleaſure is ſought after at Moſco, while the inhabitants can hardly venture to ſpeak of it at St. Peterſburg.

The common people in Ruſſia, having no ideas of liberty, are much leſs unhappy than the nobles. Beſides, they have but few wiſhes, and conſequently, their wants are leſs: they are unacquainted with either induſtry or commerce, eſpecially beyond Moſco. The Ruſſian having no property of his own, is uſually indifferent to every thing which might better his fortune. Even the nobles, who are conſtantly in fear of baniſhment, and of having their eſtates confiſcated; are not ſo much employed in improving them, as they are in expedients to raiſe a ſpeedy ſupply of ready money, to gratify their preſent inclinations.

The Ruſſian country people live upon very indifferent kind of food; and therefore, readily giving way to lazineſs in their ſtoves, they paſs their lives in the debaucheries of women and brandy, which liquor however they are not always able to procure. If we were to judge of them merely from the languid life they lead, it might be imagined, that they have but few ideas; on the contrary, they are artful, cunning, and greater rogues than any other nation. They are alſo remarkably dextrous at thieving. They are not endowed with that courage which ſome philoſophers have aſcribed to the northern nations; the Ruſſian peaſants are, on the contrary, puſillanimous and cowardly to an incredible degree.

There are no principles of morality among them; they are more afraid of neglecting the lent-faſts, than of murdering a fellow-creature, eſpecially if he is a foreigner; for they do not reckon foreigners among the number of their brethren.

againſt the Olgorouſki family in 1740, one of thoſe princes is ſentenced to death for having uſed ſome indecent expreſſions about the Czarina's perſon: another, for having miſinterpreted her wiſe regulations for the good of the empire, and for having offended her ſacred perſon by words not ſufficiently reſpectful.

The Ruſſian and the Poliſh ſlave ſeem to differ from each other in every reſpect: the Ruſſian neglects agriculture; is generally immoral, crafty and ſubtle. On the contrary, the Poliſh ſlave takes a pleaſure in cultivating the land: he is moral, and ſtupid. Theſe contrarieties ſeem to me ſufficiently accounted for from the different conſtitution of the two nations, excluſive of other cauſes, which may poſſibly have contributed to eſtabliſh them.

The ſlave in Poland is in poſſeſſion of lands which are his own property; it is natural, therefore, he ſhould delight in improving them; ſince by that he is enabled to ſatisfy all his wants, and to enjoy the comforts of life, without having recourſe to criminal actions. He is moreover ſubject to a ſet of free nobles, who may venture, in every inſtance, to be virtuous with impunity. If he is ſtupid, it is becauſe he is enſlaved. The Ruſſian ſlave not having one inch of ground at his own diſpoſal, agriculture is indifferent to him; he is willing to enjoy himſelf, and is fond of drinking brandy; but as he can ſeldom get it without theft, or treſpaſſing againſt the laws, the fear of puniſhment makes him cautious and ſubtle.

Slavery has ſet aſide all the rights of nature among the Ruſſians; the human ſpecies is in Ruſſia a commercial article, ſometimes ſold at a very low price; children are often forced from their mothers arms to be ſold to perſons given up to debauchery. The joy which other people conceive on the birth of their legitimate children is here unknown. This event, on the contrary, is a ſorrowful one to a young woman, who knows that her child may be taken away from her, at the inſtant that he is playing on her knee; ſhe ſuckles him, and takes a great deal of trouble in bringing him up; he grows, and the time draws near when ſhe is in continual apprehenſion of loſing him: ſhe never can flatter herſelf that, in this beloved child, ſhe ſhall find a ſupport and a friend in her

old age. If when ſomewhat farther advanced in life, the child perceives the tears ſtarting from his mother in conſequence of theſe dreadful reflections, he aſks her the reaſon, preſſes her cheeks between his little hands, ſooths her with kiſſes, and at length mixes his tears with hers.

The meaneſt animals enjoy the happineſs cauſed by the birth of their young: Man, in Ruſſia, is the only being who cannot partake of it. This depravity ſtifles all principles of humanity, and all kind of ſentiment. Going, on my return from Tobolſky to St. Peterſburg, into a houſe where I was to lodge, I found a father chained to a poſt in the middle of his family: by his cries, and the little regard his children paid to him, I imagined he was mad; but this was by no means the caſe. In Ruſſia, people who are ſent to raiſe recruits, go through all the villages; and pitch upon the men proper for the ſervice, as butchers, in all other parts, go into the ſtables to mark the ſheep. This man's ſon had been ſelected for the ſervice; and had made his eſcape, without the father's knowledge; the father was made a priſoner in his own houſe; his children were his goalers, and he was in daily expectation of receiving his ſentence. I was ſo much ſhocked with this account, and with the ſcene I beheld, that I was forced to ſeek another lodging immediately.

This practice has made the Ruſſians cruel and inhuman: they are animals whom their maſters think they muſt cruſh with a rod of iron, while they continue under the yoke *.

The Ruſſian nobility, having cruel and wicked ſlaves conſtantly before their eyes, have acquired a ſeverity which is not

* The common people in Ruſſia are at preſent ſo corrupt, that they muſt be kept in a ſtate of rigid ſervitude, while they continue enſlaved: but any man who allows himſelf to reflect, will eaſily conceive, that, with proper care, they might be reſtored to liberty, without having any thing to fear from ſome inconveniences which may be thought to follow at firſt. While they are ſlaves, they will ever be vicious.

natural

natural to them; as they crouch before their ſovereign, to their ſuperiors, and to all thoſe from whom they have any thing to expect, they exerciſe the greateſt rigor over all perſons ſubject to their authority, or who have not the power to reſiſt them.

The common people in Ruſſia having nothing to conteſt with the ſovereign, one might reaſonably expect to find happineſs among this claſs. In all other parts of the world, the country people get together on holidays: the fathers meet at a public houſe, oftentimes reſting from their labours under the ſhade of a tree, and indulging in a cheerful glaſs; they diſcourſe about increaſing their ſtock, and ſometimes their converſation turns upon politics, while a wretched fiddler, ſitting on a caſk, makes their children exquiſitely happy.

Such pleaſures are unknown in Ruſſia: the common people dance now and then, chiefly on certain days of the Carnival; when they are entirely given up to debauchery and drunkenneſs: ſo that one can ſcarce venture to travel at ſuch a time, for fear of being ill-treated by the mob. The peaſants in Ruſſia generally ſtay in their ſtoves on holidays, ſtanding at the door without taking any exerciſe: lazineſs is the greateſt pleaſure they have, next to women and drinking. If a Ruſſian peaſant has got a little money, he goes to the public houſe by himſelf, ſpends it, and gets drunk in a few minutes: he is then no longer in fear of his fortune being taken from him.

The young country women ſometimes amuſe themſelves, on fine days, by ſwinging upon a plank, balanced acroſs a beam lying on the ground; they place themſelves at the ends of the plank, and raiſe one another alternately five or ſix feet high with the greateſt dexterity. The men never mix in theſe diverſions, and indeed they are ſeldom with the women, out of their cottages.

Of the progreſs of the Arts and Sciences in Ruſſia. Of the genius of the nation, and of education.

PETER I. aſcended the throne of Ruſſia in 1689; and immediately framed the deſign of enlightening his nation, ſunk in ignorance for more than ſeven hundred years paſt. He undertook a journey into Europe, that he might become acquainted with the arts and ſciences, and with every circumſtance which could poſſibly tend to complete the deſigns he had formed. In the courſe of his journey, nothing eſcaped his notice; he viſited the learned; he ſought out the artiſt in his manufactory; made himſelf maſter of the art, and being thereby enabled to judge of the abilities of the artiſts, engaged them in his ſervice, whenever he found them to excel.

All the ſovereign powers intereſted themſelves warmly in promoting the ſchemes of this great man; numbers of learned men and artiſts of all kinds, from the ſeveral parts of Europe, ſet out for Ruſſia. Peter I. on his return into his own dominions, raiſed public buildings conſecrated to the Arts and Sciences. Eſtabliſhments, which in Europe were formed by degrees, aroſe in Ruſſia all at once: the nobility laid aſide their beards, as well as their ancient manner of dreſs: the women, before confined wholly to their houſes, now made their appearance in public meetings, unknown in Ruſſia till this period. The court became brilliant. Peter I. ſeemed to have formed a new nation, though he had made no alteration in the political conſtitution of the government: the nation remained in a ſtate of ſlavery, which he ſtill made more ſevere. He forced all the nobility, without diſtinction, to ſerve in the army. A number of young ſlaves were choſen out from among

among the people, and fixed in the academies and ſchools: of theſe ſome were deſtined to literature, others deſigned for the arts and ſciences, without any regard to their particular talents or inclination. Peter himſelf viſited the academies and the manufactories; and often took the plane and the chiſel in his own hands; but ſnatched the pencil from the hands of a young artiſt, who was painting Armida in the arms of Rinaldo, and ordered him to be flogged *.

The ſucceſſors of Peter I. purſued the ſame plan; the Academy of Sciences however gained a reputation; Bernouilli, Deliſle, Herman, and Euler kept up the credit they had acquired in other countries; the Arts ſhone forth with ſome kind of ſplendor; but the Academy loſt its repute, and the Arts ſenſibly decreaſed, as the great men firſt invited into Ruſſia, either died, or left the country. The ſovereigns ſtill continued to ſupply their ſubjects with able maſters, and to encourage and protect men of abilities; but, notwithſtanding theſe advantages, not one Ruſſian has appeared in the courſe of more than ſixty years, whoſe name deſerves to be recorded in the hiſtory of the Arts and Sciences.

Men of abilities invited into Ruſſia from foreign parts, appear moſtly to be diſcouraged, and not to perſevere in their ſtudies with the ſame earneſtneſs as they did in their own country. In the year 1761, ſeveral foreigners of the firſt rank in the republic of letters, belonged to the Academy of St. Peterſburg; among theſe may be mentioned M. Epiney, Leman, Braun, Tauber, Stelin, and Muler, formerly ſecretary to the Academy, and at preſent director of a ſchool at Moſco, as I was informed at my return into France. The late Mr. Lomanoſow, a Ruſſian, was a man of genius; and would have made a conſide-

* In the original, *faire donner les batogues*, a kind of puniſhment deſcribed hereafter.

rable

rable figure in any other Academy. Mr. Rumouſki, as yet too young a man to have acquired any great degree of reputation, is poſſeſſed of great natural abilities, and a thirſt after knowledge, very uncommon among the Ruſſians.

Notwithſtanding this number of learned men, it ſhould ſeem as if genius in moſt of them was weakened, as ſoon as they came into Ruſſia, ſo that the academies and ſchools ſeem to derive their chief credit from the names only of the learned which are in Ruſſia. The annals of the Sciences furniſh inconteſtable proofs of this aſſertion, and any man who has not examined theſe, may be convinced of this truth, by conſulting thouſands of travellers, who have reſided at St. Peterſburg, and at Moſco.

This ſtate of the Arts and Sciences in Ruſſia implies a defect, the cauſe of which muſt be ſought for, either in a want of genius peculiar to the nation, or in the nature of the government, and the climate. A philoſopher *, whoſe name will be held in veneration by the lateſt poſterity, ſpeaking of the difference of men with reſpect to climate, repreſents the people of the North as having coarſer organs, and being animated with fluids of a groſſer kind, better adapted to produce large robuſt bodies than men of genius; but this philoſopher would have us conſider them, at the ſame time, as a very brave, ſimple, unreſerved, unſuſpecting people, without policy or craft, having few vices, and ſeveral virtues, a great deal of ſincerity and honeſty, and whoſe diſpoſitions are not very amorous. When I travelled in Ruſſia, I every where met with a people very different from what I expected to find, from the ideas of this celebrated philoſopher. It muſt be allowed however, that, in what he has ſaid on this ſubject, he has conſidered the people of the North independently of their

* Monteſquieu, liv. xiv. chap. 2.

government; which has ſo far altered the nature of man in Ruſſia, by ſubduing even thoſe faculties which are leaſt under the controul of the authority of the ſovereign, that it is extremely difficult to aſcertain the diſtinguiſhing caracter of the nation; and it is for this reaſon that I have hitherto confined myſelf to the relation of facts upon this point.

Other philoſophers have been of opinion, that the differences obſervable in various nations with regard to genius, to abilities, and to the paſſions, ariſe merely from education, and the conſtitution of different governments. If this principle be admitted, the manners and genius of the Ruſſians, muſt be accounted for from the deſpotiſm of their government. I made obſervations during my ſtay in this country, which may poſſibly throw ſome light upon this point; but, in order to make the concluſions more evident, it will be neceſſary to remind the reader of certain truths and opinions generally admitted *.

Man, as well as animals and plants, is compoſed of ſolids; and fluids; fibres, veſſels and glands compoſe the firſt ſolids, and the reſt are derived from theſe. In man, the fluids are the chyle, the blood, and others which are ſecreted from this laſt fluid, or which proceed from its diſſolution. Theſe ſeveral ſubſtances conſtitute the human machine; but we ſtill muſt have recourſe to ſome firſt moving power which ſets this machine in motion, and gives it life. All natural philoſophers and anatomiſts place this firſt moving principle in elementary fire; ſome call it the univerſal ſpirit, the vitriolic acid, the phlogiſton, the electric matter, &c. It is this primary fluid which gives life to the whole univerſe; but it is ſo ſubtile that it acts not upon our organs, but by the medium of the air,

* Theſe truths and opinions are almoſt entirely taken from Mr. L. Cat's phyſiological works, tom. i. I here quote this learned man once for all.

and other ſecondary fluids which form our atmoſphere, and bear ſome affinity to it.

The fluid of the univerſe therefore, or this univerſal ſpirit, is the immediate cauſe of the motion of fluids in our organized body; and theſe give riſe to the elaſtic powers and vibrations of the veſſels and of the nerves, and actuate the whole animal machine.

We inſpire the fluid of the univerſe with the common air, and it is combined with our food, by the analogy it bears to theſe ſubſtances, or rather to the air they contain. The organs and fluids inſervient to digeſtion ſeparate the part of theſe aliments, and from thence make an extract of the chyle, in which the univerſal fluid receives a new modification. The chyle is then the primary fluid, from whence all others are derived, ſo that theſe laſt muſt neceſſarily partake of ſome of the properties of the former. The chyle then paſſing into the veſſels through which the circulation is carried on, is changed into blood. This fluid, having attained its higheſt perfection in paſſing through the lungs, is driven by the heart through the aorta to all parts of the body, and is chiefly and immediately directed to the brain, where it is depurated through the fineſt ſtrainers, and deprived of all its groſſer particles, which remain in the blood; and from the union of this pure and highly depurated liquid, the animal fluid or nervous juice is formed; which is therefore the produce of all the aliments changed into chyle and blood, modified by this univerſal ſpirit, and combined with it. This fluid, which I ſhall hereafter call nervous juice, and which Mr. Le Cat names the animal fluid, is the chief organ of ſenſation and of the faculties of the ſoul: it exiſts in beaſts as well as in men, and perhaps alſo in plants, with which our formation and growth ſeems to have a remarkable analogy.

The nervous juice makes a kind of lake in the brain; the ſpinal marrow is the principal channel which conveys it from thence, and the nerves are ſo many rivers or ſtreams which ſprinkle and vivify all the parts of the animal. The nerves being tubes, their texture is ſuch, that the ſides of the canals are compoſed of other much ſmaller tubes; which terminate by one extremity in the brain, and by the other on the ſkin, where they expand and form a net-work of nerves: the nervous juice having been depurated through the ſubſtance of the brain, is conveyed by the fibres of this organ, and poured immediately into the nerves: the groſſer part received into the cavity of the nerve, becomes the principle of motion, and the finer part of this nervous juice flows in the ſmall tubes of the ſides of the nerves; where, notwithſtanding the ganglions ſcattered throughout the nerves, it forms one continued ſtream, which becomes the organ of ſenſe. This nervous juice, as ſubtile as light, tranſmits inſtantaneouſly to the brain, all the impreſſions it receives. This account of the nerves, and of the nervous juice, eſtabliſhes the ſyſtem of our ſenſations, of our ideas, of the mind, of the genius, and of all the faculties of the rational ſoul.

By the method in which the nervous juice is formed, it appears to be the produce of our food combined with the univerſal fluid: it muſt therefore partake of ſome of the properties of our aliments, and, if I may be allowed the expreſſion, of the ſoil from whence it ſprings, as the fluid does which circulates through plants.

The univerſal ſpirit, although every where the ſame, acts upon our organs only through the medium of the air, and other ſecondary fluids of our atmoſphere. Its action and influence depend therefore on ſecondary cauſes; which is clearly evinced from the effects of cloudy and rainy weather. Some people can even foretel theſe changes of weather from the infirmities

firmities they are afflicted with; and thoſe who enjoy the beſt ſtate of health, are dull and heavy; the whole body is depreſſed, becauſe the influence of the univerſal fluid being impeded, the action of the fluids which nouriſh our ſolids, and keep up the animal œconomy, is obſtructed in a proportionate degree. Suppoſing then, that there was really a climate in which theſe natural cauſes were always the ſame, or in a proportion nearly equal, it is certain that men in ſuch a climate would be affected in the ſame manner, and would ſeldom be endowed with the powers of genius.

Since then the atmoſphere has ſuch a powerful influence over the conſtitution of man, and conſequently over his faculties, its effects muſt bear a mutual analogy to the different heights of the ſoil on which the man lives, independently of other local cauſes, which muſt alſo make ſome exceptions to this general law. This is a received opinion with reſpect to the vegetable ſyſtem. In many inſtances, the height of the ſoil is determined by knowing the plants which grow upon it; and the height of the ſoil being given, we may tell what plants it produces. Theſe facts are generally admitted, for better obſervations have been made on plants than upon men; poſſibly, becauſe the change of place, and the mixture of one nation with another, having obliterated all marks of the original caracters of men, it has been more difficult to trace them, as Mr. Rouſſeau obſerves.

The atmoſphere is compoſed of different fluids, vapours and exhalations, ariſing from the ſurface of the earth. If we ſuppoſe the atmoſphere divided into layers, the firſt layer will contain the groſſer particles; and in proportion as we riſe, the air will become purer, be more elaſtic, and the univerſal fluid will become proportionally more active.

From theſe general opinions, we muſt acknowledge with Mr. de Monteſquieu, the influence of the climate upon the inhabitants;

tants; perhaps this great man may have extended its effects too far.

It is equally evident from what has been ſaid, that in any compariſon we would make between climates and the caracters of men, it is neceſſary to attend to the height of the ſoil on which they dwell.

The kingdom of Ruſſia, from St. Peterſburg to Tobolſky, may be conſidered as one extenſive plain, divided by a chain of mountains croſſing from ſouth to north at the 75th degree of longitude. In different parts of this plain, we meet with high places or platforms, as at Moſco, and Caccy, and hillocks or riſing grounds in other parts, as on the road from St. Peterſburg to Moſco; but the height of theſe is very inconſiderable. I have taken the level of this plain from St. Peterſburg to Tobolſky, upon an extent of near ſeven hundred leagues; and I have croſſed and taken the level of the chain in the ſame manner in two different places, about ſixty leagues diſtant from each other. By theſe levellings I have obtained, very exactly, the heights of all the places in which I have made obſervations during my journey. Theſe reſults, connected with the geography and other informations I have been able to acquire, have enabled me to determine the height of the Ruſſian land, from St. Peterſburg to Tobolſky, with more accuracy than was neceſſary for my preſent purpoſe.

I conſider the country between St. Peterſburg and Tobolſky, as one vaſt plain, of about ſeven hundred leagues from weſt to eaſt, and five hundred leagues from ſouth to north; bounded by the Baltic weſtward, by the Frozen Ocean to the north, by the Black Sea and the Caſpian to the ſouth, and by the river Irtyſz eaſtward. This immenſe plain is compoſed of divers others which form new plane ſurfaces. I have diſtinguiſhed however but two of theſe: the loweſt of them is ſituated near the ſea, and extends ſometimes as far as one hundred, or one

hundred

hundred and fifty leagues, as from St. Peterſburg to Jachelbiza, over a diſtance of 90 leagues of 2000 toiſes each. I have determined the mean height of this plane at thirty-one toiſes above the level of the ſea, and that of the ſecond at fifty toiſes. The laſt reaches over the greater part of this plain, which I croſſed over, an extent of more than 400 leagues. Other intervening plains are ſometimes to be met with, as in the neighbourhood of Tobolſky. The height of the laſt plane ſurfaces is about fourſcore toiſes; but their extent is inconſiderable, and they draw near to the two former, lowering towards the north, and riſing to the ſouth.

The hillocks and platforms are found chiefly on the ſecond plane, which I have found to be one hundred and fifty toiſes. Theſe inequalities are not frequent: their height, with reſpect to the level of the ſea, is two hundred and twenty toiſes, and about ſeventy above the plane on which they ſtand; they often extend twenty leagues in diameter, and ſometimes more. The aſcent to the ſummit of them is eaſy and almoſt imperceptible. The mountainous country comprehends the chain of mountains which divides Ruſſia from Siberia. This is the only chain we meet with throughout this extenſive ſurface, of about ſeven hundred leagues in length, and five hundred in breadth. The ſituation of the chain is likewiſe upon this ſecond plane, which riſes one hundred and fifty toiſes above the level of the ſea. I have fixed the mean height of theſe mountains, from a great number of obſervations, at two hundred and ninety toiſes; and conſequently, they are not more than one hundred and forty toiſes above the plane they ſtand upon. There are however ſome few of them in the confines of Echaterinenburg and Solikamſky, which riſe as high as three hundred and nine, and four hundred and ſeventy-one toiſes.

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From this account it appears, that this part of Ruſſia in general is compoſed of immenſe plains almoſt on a level. Such inequalities are not to be met with here, as in France; theſe have a remarkable effect on the varieties obſervable in the ſoil of the French provinces, and on the nature of the atmoſphere. Towards the ſouthern parts of this kingdom, theſe inequalities form mountainous countries, and, in the others, hills and hillocks, more or leſs raiſed: ſo that although France does not extend more than about two hundred and forty leagues from weſt to eaſt, and two hundred and twenty-five from ſouth to north, yet the produce varies in almoſt all its provinces, which are thirty-eight in number; and very ſtriking differences may alſo be obſerved in the inhabitants, independent of the general caracter of the nation. Such differences are univerſally noted between the inhabitants of Gaſcony, Normandy, Picardy, Bretany, Champaigne, and Berry: and have given riſe to the jokes that have been paſſed upon them.

Ruſſia is, on the contrary, almoſt on a level; and indeed the ſame vegetable productions are obſerved all the way from St. Peterſburg to Tobolſky; a ſmall quantity of corn, and ſome hemp, in an extent of near ſeven hundred leagues; and, from the gates of St. Peterſburg to thoſe of Tobolſky, going by Solikamſky, we meet with nothing but pines, firs, and ſome kinds of the lighter woods. This ſtriking uniformity prevails equally among the animals, and among the inhabitants; the rivers contain the ſame kinds of fiſh, except the ſterlet, which is more ſcarce as one comes nearer to St. Peterſburg. The ſame animals are found in the woods. The ſoil in the neighbourhood of Tobolſky being more ſwampy than in any other part, there are here a greater number of water fowl, and ſome of them indeed different from any that are found throughout the reſt of Ruſſia. Some fruit trees grow in the neighbourhood of Moſco; but theſe trifling exceptions

cannot

cannot be ſaid to invalidate the general rule, which prevails in its full extent.

With regard to the men, whoever has been through one province knows all the Ruſſians; they are of the ſame ſtature, they have ſimilar paſſions, ſimilar diſpoſitions, and their manners are alike. There is not even the leaſt variety in their amuſements, in their exerciſes, in their manner of cultivating the land, or in their dreſs. This uniformity is apparent even in their houſes. The Wotiaks however, the Scheremichs, the Schuwaſchi, and the Tartars, are exceptions to this general rule: theſe people, who have fixed themſelves in ſmall diſtricts of Ruſſia towards the weſtern borders of Siberia, have continued the dreſs that was peculiar to them: ſome have kept their religion, and ſome their manners; but in every circumſtance dependent on the climate, natural cauſes have acted ſo powerfully, as to bring theſe people to the ſame ſtandard, and make Ruſſians of them all. The Wotiaks indeed are of low ſtature, as we have before obſerved in ſpeaking of them.

I have taken notice of there being ſome difference between the people who live in the higher countries and thoſe who dwell in the plains; and have even mentioned ſome inſtances of this ſort in the account of my journey, not knowing at that time that I ſhould make uſe of them in the manner I am now going to do. In the higher parts of the country, I have found more vivacity and cheerfulneſs than in the lower grounds, eſpecially at Makhneva. I have made the ſame obſervations at Echaterinenburg, where the difference was ſtill more obvious; and would be ſtill more remarkable, on comparing the inhabitants of Moſco, with thoſe of St. Peterſburg; although the government, as I have before obſerved, contributes much to this difference in the two laſt-mentioned cities. Theſe diſtinctions however, between the inhabitants of the plains and thoſe of the

higher grounds, are not ſo apparent as they are in other parts of Europe.

The ſlope of the rivers in the immenſe plains of Ruſſia is but ſmall; the rain waters, and thoſe which proceed from the melting of the ſnows, do not eaſily run off. Theſe waters generally make the country very marſhy: the earth, whoſe ſurface is almoſt entirely covered with wood, ſtill contributes to make the atmoſphere more moiſt; and the ſummer ſeaſon does not laſt long enough, to admit of the ſoil being dried up by the ſun. Hence the number of marſhes met with in Ruſſia, even in the middle of the continent, and at the diſtance of three or four hundred leagues from the ſea.

The winter appears to be the only ſeaſon in which the Ruſſians can enjoy the benefits of a pure atmoſphere; and then the cold is ſo intenſe, that all nature ſeems to be lifeleſs and totally inactive. All the inhabitants, ſhut up and confined within their ſtoves, breathe an air infected by exhalations and vapours proceeding from perſpiration. They paſs their time in theſe ſtoves wholly given up to indolence, ſleeping almoſt all day in a ſuffocating heat, and taking hardly any exerciſe. This manner of living, and the climate, produces ſuch a degree of diſſolution in the blood of theſe people, that they are under a neceſſity of bathing twice a week all the year round, in order to get rid of the watery diſpoſition prevalent in their conſtitutions, by raiſing an artificial perſpiration.

We may readily conclude from what has been ſaid, that the nervous juice in the Ruſſians is inſpiſſated and ſluggiſh, more adapted to form ſtrong conſtitutions than men of genius: their internal organs have loſt their elaſticity and vibratory powers; the flogging they conſtantly undergo in the baths, and the heat they experience there, blunts the ſenſibility of the external organs. The nerves being no longer capable of receiving impreſſions, cannot tranſmit them to the internal or-

gans; and indeed M. de Monteſquieu obſerves, that, to make a Ruſſian feel, one muſt flay him *. The want of genius therefore among the Ruſſians, appears to be an effect of the ſoil and of the climate.

This opinion might farther be confirmed by other arguments equally ſtrong; but as this work is intended to relate facts only, I muſt not dwell any longer upon this digreſſion, which may already have been tedious.

The ſpirit of invention is as uncommon among the Ruſſians, as genius; but they have a peculiar turn for imitation. In Ruſſia, lockſmiths, maſons, carpenters, *&c.* are formed as a a ſoldier is in other countries. Each regiment has, in its own corps, all the neceſſary artiſts; and is not obliged to have recourſe to manufactures, as is the cuſtom every elſe. They determine by the ſtature, what employment a man is moſt fit for. They give a ſoldier a lock for a pattern, with orders to make others like it, and he does it with the greateſt dexterity; but the original muſt be perfect, otherwiſe he would copy it with all its defects, however eaſy it might be to correct them. The ſame may be obſerved with regard to artiſts and workmen of all kinds.

This particular talent of the Ruſſians is ſo remarkable, that one may ſee it prevail in the nation, immediately on coming into Ruſſia. One may eaſily perceive, that the Ruſſians poſſeſs it in ſo eminent a degree, that they might have been formed into a very different people from what they are at preſent.

I have obſerved that the Ruſſians were naturally cheerful; that they have the true ſpirit of ſociety, and that they delight in it; theſe circumſtances are evident in the Ruſſians who travel into foreign countries. Why then is a Ruſſian, at leaſt in ſome reſpects, ſo different from what he might be? The nature of education and of the government will furniſh the ſolution of this problem.

* Liv. xiv. chap. 2.

In a good government, the education of children ſhould be directed to virtue, the love of our country, and the happineſs of ſociety. Such an education is intimately connected with the political ſyſtem of a good government; but it ſuppoſes that the intereſt of the ſovereign ſhould be the ſame as that of the nation. The regularity and harmony of a good adminiſtration conſiſts in the relations and exact combinations of theſe two intereſts; this conſtitutes the power of the ſovereign, and the happineſs of the people. Hence ariſes that love of our country, which induces every citizen to conſider the good of the nation as his own; public gratitude inſpires and keeps up the love of fame, brings forth great men, and inſures them the veneration of poſterity.

The love of fame and of our country is unknown in Ruſſia; deſpotiſm debaſes the mind, damps the genius, and ſtifles every kind of ſentiment. In Ruſſia no perſon dares venture to think; the ſoul is ſo much debaſed, that its faculties are deſtroyed. Fear is almoſt the only paſſion by which the whole nation is actuated.

I have ſeen in their ſchools, a young mathematician ſtudying Euclid with a piece of wood faſtened to his neck; and maſters commanding abilities, as an army is taught to exerciſe.

I was told by a famous foreign artiſt, who had the direction of one of theſe ſchools, that he once found among his pupils one of a ſuperior genius. Deſirous of puſhing a young man forward, who might do him honor, he took great care in inſtructing him; he was well pleaſed to obſerve the daily improvements of his pupil; but in a little time the young man ſtopt ſhort. The artiſt, having tried to encourage him by all kinds of mild proceedings, aſked him at laſt in a very friendly manner, why he had taken a diſlike to his buſineſs. I am, anſwered the young man, ſlave to M * * *; when he finds that I am a proficient, he will oblige me to work in his houſe,

where

where I ſhall meet with ſuch ill treatment, that I had much rather live in the ſame manner as my companions.

I have known ſeveral perſons who were perſuaded that the Ruſſians were incapable of making any conſiderable improvements in any thing. I think this opinion is entirely groundleſs; ſuch facts as I have been relating of this young ſlave, have given riſe to this miſtake. Theſe facts, on the contrary, imply at leaſt a great ſhare of judgment.

The government has attempted to rectify ſome of theſe inconveniences, by ordering that all perſons who ſhould diſtinguiſh themſelves at the ſchools, ſhould no longer be ſlaves to their lords, but ſhould belong to the ſtate. In this caſe, the lords will either avoid ſending their ſlaves to the ſchools, or will find ſome means of keeping them to themſelves, ſo that they muſt ſtill remain in a ſtate of ſlavery.

I could mention a number of facts of the ſame kind as the former, of which I have been witneſs; but I ſhall paſs them over, to avoid giving offence to ſome perſons at preſent in Ruſſia. The fatal effects of deſpotiſm are extended over all the arts, all the manufactures, and are conveyed into all the work-ſhops. The artiſts are chained down to their work. This I have ſeen frequently, eſpecially at Moſco, and it is with ſuch workmen that the Ruſſians imagine they can imitate the manufactories of Lyons.

Peter I. was perſuaded, and the whole nation continues in the ſame opinion to this day, that the Ruſſians muſt be governed in this manner. There might be reaſon for this conduct in ſome reſpects, at the time that Peter I. came to the throne, but it is very ſtrange that ſuch a prejudice ſhould ſtill prevail in Ruſſia.

The pride of the Ruſſians is ſtill a great hindrance to the progreſs of the Arts and Sciences in this nation. This is a national vice, and to be obſerved in all ſtations. As ſoon as a lear-

a learner has made ſome little improvement, he thinks he knows as much as his maſter, and preſently after, even more. The public in Ruſſia is ignorant enough to ſuppoſe him equal, and among other diſadvantages attending this falſe preſumption, it adds to the diſagreeable circumſtances a foreigner is already expoſed to, who is called into the country to inſtruct the Ruſſians; ſo that foreign artiſts are often obliged to keep their pupils under, in order to preſerve their own importance. Moſt of them, diſpleaſed with their ſituations, are leſs anxious about endeavouring to bring up good workmen, than they are about making a fortune, which they ſeldom carry off into their own country. I did not meet with one ſingle foreigner in Ruſſia, who did not look back with regret to the time he had ſpent among his fellow-citizens.

The nobles, devoted to the military ſervice, ſend their children to the *Corps of Cadets*, a kind of college inſtituted for the education of the nobility, or bring them up in the midſt of their families; they treat the governors intruſted with the education of their children with the greateſt regard; but are often obliged to put their youth under the direction of maſters very unequal to ſuch a taſk, moſt of them being perſons diſappointed of the ſucceſs they ſought for in Ruſſia. Such maſters are ſeldom fit to form the young nobility; and the fathers, who are themſelves ignorant, and debaſed by ſlavery, are ſtill leſs able to contribute uſefully to the education of their children, to mould their hearts, and inſpire them with proper ſentiments. The deſpotic ſovereign does not fail to make them ſenſible of the danger of acquiring any kind of knowledge of which abſolute power might be jealous.

It is eaſy to conclude from what has been ſaid on this ſubject, that it is owing to the nature of the conſtitution and to want of proper education, that the Ruſſians have made ſo little improvement in the Arts and Sciences; and that theſe people, though

though deficient in genius, and deprived of the powers of imagination, would ſtill be a very different nation in many reſpects, if they enjoyed the bleſſings of liberty. But the queſtion is, whether they would make any conſiderable progreſs, even if they enjoyed this advantage. This I cannot take upon me to determine. It were perhaps to be wiſhed, if we agree with M. Rouſſeau of Geneva, that this nation had never been poliſhed. However this may be, it is certain, that the general turn and ſpirit of the nation ſeems likely to undergo a total change under the reign of the Empreſs Catherine. Convinced, as ſhe is, that the learned man, in whom the genius for ſublime geometry is combined, with a diſpoſition for philoſophy and literature, is capable of aſſiſting her in her deſigns of eſtabliſhing a good government, by enlightening the minds of her ſubjects, ſhe has given this philoſopher an aſylum near her throne, and indulged him in the advantages of coming near a ſovereign who honors and cultivates the Sciences. She entertains the learned Euller, whoſe mathematical labours have immortalized his name. This great man is employed a ſecond time in inſtructing the Ruſſians. What progreſs will they not make under the reign of this Empreſs? She has already taken all the neceſſary ſteps to inſure the ſucceſs of the obſervation of the Tranſit of Venus over the ſun; many of her ſubjects are to obſerve it in different places of this extenſive empire. Her views are, to form a new nation: Peter the Great firſt conceived the deſign, laid the plan, and made way for the event; the honor of completing the glorious undertaking ſeems to be reſerved to the Empreſs Catherine.

Of the laws, of punishments, and of exile.

M. VOLTAIRE, one of the first writers in Europe, tells us in his history of Russia *, that in 1722 Peter I. finished the new code of laws begun in 1718, and improved under the Empress Elizabeth. Peter I. forbad all the judges, on pain of death, to deviate from this code, or to substitute their private opinions to the general law. This severe decree was fixed up, and is still posted in all the courts of judicature throughout the empire. He also forbad the judges, under the same penalties, to receive any fees, and every man in office to accept of any presents. Moens *de la Croix*, chamberlain to the Empress Catherine, and his sister, Madame de Balc, lady of the bedchamber to the Empress, being convicted of having taken presents, Moens was condemned to be beheaded, and his sister, a favorite of the Empress, to receive eleven strokes of the knout. This lady's two sons, one chamberlain, and the other page, were disgraced, and sent to serve as common soldiers in the army in Persia †.

This severity is greatly relaxed since the death of Peter I. All the provinces I have passed through, have their own courts of justice, which are called chanceries: the tribunals relating to civil and criminal matters, depend upon the senate, and upon the college of justice. I have observed that, in all courts of chancery at any distance from the capital, justice was almost publicly sold, and the poor man, though innocent, was generally sacrificed to the wealthy criminal.

* Tom. ii. chap. 13. des Loix, pag. 222.
† M. de Voltaire, pag. 277.

Since

Since the acceſſion of the Empreſs Elizabeth to the throne of Ruſſia, the puniſhments are reduced to two kinds, the *padogi*, and the *knout*.

The padogi are conſidered in Ruſſia merely as a correction of the police, exerciſed on the ſoldier by military diſcipline, by the nobility on their ſervants, and by perſons in authority over all ſuch as are under their command.

I ſaw this puniſhment inflicted at my return from Tobolſky to St. Peterſburg. I looked out of a window, on hearing ſomebody cry out in the yard, where I ſaw two Ruſſian ſlaves pulling a girl of fourteen or fifteen years of age by the arms; ſhe was tall and well made. By her dreſs, ſhe appeared to belong to ſome good family. Her head dreſſed without a cap, was reclined backwards; her eyes, fixed on one perſon, pleaded for mercy; which her beauty ſhould ſeem to have inſured her, independent of her tears. Nevertheleſs, the Ruſſians led her into the middle of the yard, and in an inſtant ſtripped her to the waiſt; they then laid her proſtrate on the ground, and placed themſelves on their knees; one of them holding her head tight between his knees, and the other, the lower part of her body: rods were then brought, which they continued conſtantly applying on the back of this girl, till ſome one cried out, *Enough*. This unfortunate victim was then raiſed, ſo disfigured that ſhe was ſcarcely to be known; her face and her whole body being covered with blood and dirt. This ſevere puniſhment led me to imagine, that the young girl had been guilty of ſome very flagrant offence: ſome days after I learned, that ſhe was a lady's waiting-maid; and that her miſtreſs's huſband had ordered her to be puniſhed in that manner, on account of ſome neglect. In any other part of the world, ſhe might perhaps have been turned away, if her miſtreſs had happened to be in an ill humour. The Ruſſians think themſelves obliged to treat their ſervants thus, in order to make them faithful. Theſe unhappy ſlaves, finding ſo many

petty tyrants in their maſters, are obliged on this account to live in perpetual miſtruſt: ſo that even in the midſt of their families, they are under a neceſſity of being conſtantly on their guard with every perſon who comes near them.

I never ſaw the puniſhment of the knout inflicted; but as I was going over St. Peterſburg with a foreigner, who conducted me to ſee all the curioſities in the city, we ſtopped upon the ſpot where Mad. Lapouchin had ſuffered this puniſhment. The foreigner had been preſent on this occaſion; and was ſtill ſo much affected with the affair, that he gave me a particular account of it on the very ſpot. I ſhall relate the incident as he told it me, and as I found it in my journal.

Every body who has been at St. Peterſburg, knows that Mad. Lapouchin was one of the fineſt women belonging to the court of the Empreſs Elizabeth: ſhe was intimately connected with a foreign ambaſſador, then engaged in a conſpiracy. Mad. Lapouchin, who was ſuppoſed to be an accomplice in this conſpiracy, was condemned, by the Empreſs Elizabeth, to undergo the puniſhment of the knout. She appeared at the place of execution in a genteel undreſs, which contributed ſtill to heighten her beauty. The ſweetneſs of her countenance, and her vivacity, were ſuch as might indicate indiſcretion, but not even the ſhadow of guilt; although I have been aſſured by every perſon of whom I have made inquiry, that ſhe was really guilty. Young, lovely, admired and ſought for at the court, of which ſhe was the life and ſpirit; inſtead of the number of admirers her beauty uſually drew after her, ſhe then ſaw herſelf ſurrounded only by executioners. She looked on them with aſtoniſhment, ſeeming to doubt whether ſuch preparations were intended for her: one of the executioners then pulled off a kind of cloak which covered her boſom; her modeſty taking the alarm made her ſtart back a few ſteps; ſhe turned pale, and burſt into into tears: her clothes were ſoon after

after ſtripped off, and in a few moments ſhe was quite naked to the waiſt, expoſed to the eager looks of a vaſt concourſe of people profoundly ſilent. One of the executioners then ſeized her by both hands, and turning half round, threw her on his back, bending forwards, ſo as to raiſe her a few inches from the ground: the other executioner then laid hold of her delicate limbs, with his rough hands hardened at the plough, and, without any remorſe, adjuſted her on the back of his companion, in the propereſt poſture for receiving the puniſhment. Sometimes he laid his large hand brutally upon her head, in order to make her keep it down; ſometimes like a butcher going to flay a lamb, he ſeemed to ſooth her, as ſoon as he had fixed her in the moſt favorable attitude.

This executioner then took a kind of whip called knout, made of a long ſtrap of leather prepared for this purpoſe: he then retreated a few ſteps, meaſuring the requiſite diſtance with a ſteady eye; and leaping backwards, gave a ſtroke with the end of the whip, ſo as to carry away a ſlip of ſkin from the neck to the bottom of the back: then ſtriking his feet againſt the ground he took his aim for applying a ſecond blow parallel to the former; ſo that in a few moments all the ſkin of her back was cut away in ſmall ſlips, moſt of which remained hanging to the ſhift. Her tongue was cut out immediately after, and ſhe was directly baniſhed into Siberia. This incident is known to all perſons who have been in Ruſſia. In 1762, ſhe was recalled from baniſhment by Peter III.

The ordinary puniſhment of the knout is not diſgraceful, becauſe every individual under this deſpotic government is expoſed to incidents of the ſame nature, which have often been the conſequence merely of court intrigues.

Ruſſians who have committed crimes with regard to ſociety, are condemned to the great knout. This puniſhment is generally uſed on the ſame occaſions, as racking on the wheel in

France. The great knout differs only in ſome particulars from the common knout: the criminal is raiſed into the air by means of a pully fixed to a gallows, and a cord faſtened to the two wriſts tied together; a piece of wood is placed between his two legs, alſo tied together; and another of a crucial form under his breaſt. Sometimes his hands are tied behind his back; and when he is pulled up in this poſition, his ſhoulders are diſlocated.

The executioners can make this puniſhment more or leſs cruel: they are ſo dexterous, that when a criminal is condemned to die, they can make him expire at pleaſure, either by one or ſeveral laſhes.

Beſides the puniſhment of the knout, that of breaking on the wheel was in uſe before the reign of the Empreſs Elizabeth. Sometimes criminals were impaled through the ſide: ſometimes they were hanged by the ribs upon hooks; in which ſituation they lived for ſeveral days; as did women who were buried alive up to the ſhoulders, for the murder of their huſbands. Beheading was a puniſhment equally inflicted on the common people as on the nobility.

It appears evidently from the example of the kingdom of Ruſſia, that neither the death of criminals, nor the ſeverity of their corporal puniſhments, do contribute to reform mankind.

The Empreſs Elizabeth has kept up the puniſhment of the knout only, as I have before obſerved; criminals are even ſeldom condemned to this; baniſhing of the nobility, confiſcating their property, and putting the common people to public labour, have been ſubſtituted inſtead of it. I have known ſeveral perſons, who blamed the conduct of the Empreſs Elizabeth in this reſpect, conſidering theſe puniſhments as too mild.

There may be ſome reaſon for this opinion with regard to crimes of a peculiar nature; but, it is evident that ſuch perſons were little acquainted with the nature of baniſhment as practiſed in Ruſſia.

All criminals condemned to public labour are treated in the ſame manner; they are ſhut up in priſons ſurrounded by a large piece of ground, incloſed with ſtakes, fifty or ſixty feet high; in bad weather they retire within ſide the priſon, and when the ſeaſon permits they walk about in the incloſure. They have all chains to their feet; and are kept for a very trifling expence, being generally allowed nothing but bread and water, or, according to the place they are in, ſome other food inſtead of bread. They are guarded by a certain number of ſoldiers, who lead them to the mines, or other public labours; where they are treated with the utmoſt ſeverity. This puniſhment in many inſtances is not adequate to the crimes: it has not that effect on the minds of the Ruſſians as one might expect, becauſe they are ſlaves. It would certainly have a very different effect on a free and civilized nation; where a perpetual puniſhment of this kind would prove a more powerful reſtraint on the people than the fear of death. Some villains even look upon that moment as the end of all their ſufferings, to which circumſtance we may impute the reſolution with which ſome of them have behaved on the ſcaffold; but I believe it might be very dangerous to expoſe ſuch criminals, as they do in Ruſſia, to the public view. The habit of ſeeing theſe unhappy people at length deſtroys ſenſibility; and this ſentiment is of ſuch importance to ſociety, that every method ought to be taken to preſerve it among people who are already poſſeſſed of it, or to excite it in the breaſts of thoſe who are yet ſtrangers to it. I am perſuaded that the diſagreeable ſight of ſuch a number of wretches in chains as are met with in moſt of the towns in Ruſſia, has contributed much to produce that ferocity and

ſavageneſs

ſavageneſs of caracter ſo remarkable among the inhabitants of this realm.

Perſons condemned to baniſhment are not all treated in the ſame manner; ſome are ſhut up, and others allowed a little liberty. Count Leſtoc, after having placed the crown on the head of the Empreſs Elizabeth, was baniſhed with his lady. Leſtoc was arreſted firſt, and ſhut up in the fort of St. Peterſburg. His wife was a native of Livonia, of one of the moſt noble families: ſhe was maid of honor to the Empreſs before ſhe married count Leſtoc; and though living at court, had ſtill preſerved the noble pride, inſpired by that liberty which the province of Livonia, conquered by Peter I., ſtill enjoys. The counteſs of Leſtoc being arreſted, took off all the diamonds belonging to her dreſs, as well as her watch, and other trinkets, and throwing them at the feet of thoſe who took her up, told them to lead her to the place they were ordered to conduct her to: ſhe was ſhut up in the ſame caſtle with her huſband, but in a ſeparate apartment: all their effects were put under ſeal, in expectation of the ſentence of the private court of chancery. Theſe illuſtrious priſoners, given up to this odious tribunal, the judges of which were avowed enemies to count Leſtoc, eſpecially M. de Beſtuchef, the firſt miniſter *, looked upon their ruin as inevitable, and therefore did not endeavor to offer much in their defence. Leſtoc had received a ſum of money from a foreign power in alliance with Ruſſia, and it was to this power that the Empreſs Elizabeth was indebted for the crown. The receiving of this preſent was the great charge brought againſt count Leſtoc; on being queſtioned, he owned

* I have read in ſome manuſcript notes on Ruſſia, that in 1741 the Empreſs Elizabeth had aboliſhed the ſecret chancery on her acceſſion to the throne, and had referred to the ſenate all the matters which uſed to be tried there; but it does not appear that this order was ever carried into execution. Count Leſtoc and his peers have never been judged by the ſenate, nor by any real court of juſtice.

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he had received it; but his judges having aſked him the value of the ſum; his anſwer was: *I do not recollect, but if you are deſirous of knowing, the Empreſs Elizabeth can tell you*; and indeed, he had informed this princeſs that this ſum had been offered to him, on account of the favors ſhe ſhewed him; and the Empreſs had allowed him to accept of it.

The counteſs of Leſtoc, as fully convinced of the ſentence that would be given, as ſhe was of her own and her huſband's innocence, only begged one favor of the judges, that ſhe might be beheaded; but that they would ſpare her ſkin, that is, that ſhe might not receive the puniſhment of the knout.

Notwithſtanding all the contrivances of Beſtuchef, the Empreſs Elizabeth would never conſent that theſe priſoners ſhould be condemned to the knout: all their eſtate was confiſcated; they were baniſhed into Siberia, ſhut up in different places, and not allowed to correſpond with each other.

The counteſs of Leſtoc had but one room to live in: her furniture conſiſted of a few chairs, a table, a ſtove, and a bed without curtains, made of ſtraw, with one coverlet; ſhe got clean ſheets but twice in the firſt year. Four ſoldiers conſtantly watched her, and lay in her chamber; from whence ſhe was not allowed to ſtir, even for the common neceſſities of life: ſhe had only a few ſhifts to change now and then. Leſtoc gave out at his return, that his wife had been ſurpriſed, that the vermin, the neceſſary conſequence of the filth ſhe was obliged to live in, had not alone been ſufficient to deſtroy her. She uſed to play at cards with the ſoldiers, in hopes of getting four or five pence to diſpoſe of as ſhe pleaſed, which however was not always allowed. Being one day out of humour with the officer who commanded, he ſpat in her face, and afterwards made her captivity ſtill harder.

Count Leſtoc was ſtill more unhappy, becauſe the vivacity of his diſpoſition made him very impatient of the leaſt contradiction;

diction; and he was only indulged in the liberty of walking about his room, on condition that he avoided coming near the window.

The Empreſs Elizabeth, however, had allowed Leſtoc, as well as his wife, twelve French livres *per* day, which was very favorable treatment in Ruſſia; but theſe exiles were not permitted to touch the money allotted to them, leſt they ſhould have employed it in bribing their guards: the officer of the guard therefore was treaſurer, he was ordered to procure them all neceſſaries, and he let them want for every thing.

A few years after, count Leſtoc and his lady were ſuffered to live together: they had then ſeveral apartments, and a ſmall garden at their diſpoſal; the counteſs of Leſtoc worked in the garden, fetched water, brewed, baked, waſhed, *&c.*——Sometimes even the officer of the guard introduced company to them: one of his friends, who had conducted a party into Siberia, deſired to ſee the count. This officer having contracted a kind of intimacy with him, propoſed a party of play. Leſtoc won four hundred French livres: this ſum was a fortune for the two exiles; they were ſoon after informed, that it belonged to the party this officer conducted. The counteſs fell at her huſband's feet, intreating him to return the money to this imprudent ſoldier; Leſtoc raiſed her up, and ſent the money to the neareſt village to be diſtributed among the poor.

After the baniſhment of M. de Beſtuchef, count Woronzof, the high chancellor, attempted ſeveral times to have Leſtoc recalled, as he was thoroughly perſuaded of his innocence; but the Empreſs Elizabeth would never liſten to his intreaties on this point: ſhe was however particularly attentive in giving orders to have wine ſent to him from time to time, knowing he was very fond of it.

Leſtoc

Leſtoc and his lady were at length recalled by Peter III. after fourteen years exile: Leſtoc came to St. Peterſburg in the dreſs of the lower ſort of people, which is commonly made of ſheeps ſkin *. All the noblemen of the court, and all foreigners flocked eagerly to ſee him, endeavouring to make him forget the time he had paſt in exile. The friendly proffers he received were ſincere, becauſe every body knew he was innocent; the Empreſs Elizabeth never had a ſubject more firmly attached to her; and he had conſtantly maintained his allegiance during his exile: he declared that M. de Beſtuchef had been the cauſe of it, and that the Empreſs had only given way to the importunities of this miniſter.

Count Leſtoc, though ſeventy-four years old, ſtill preſerved all that firmneſs, which had been ſo neceſſary to him when he placed the princeſs Elizabeth on the throne. He uſed to give a circumſtantial account of this event, and of his baniſhment, in public company; although he knew very well that the ſtory was highly diſagreeable to the Ruſſians, and that he thereby expoſed himſelf daily to be baniſhed again; nor were the admonitions of his friends of any weight with him in this matter. Peter III. having done him the honor of admitting him to his table, Leſtoc ſpoke to him in the following terms: "Sir, my "enemies will not fail to do me all the miſchief they can, but "I hope your majeſty will permit an old man, who has but "few days to live, to prate on, and die in peace." He claimed all the effects that had been taken away from him when he was arreſted; they had been already diſtributed among ſeveral private perſons, according to cuſtom. He declared he would take poſſeſſion of them wherever he found them. He alſo demanded, that an account ſhould be given him of his jewels, and of the money the officers of the guard had received during his

* In the original, *habit de mouſic.*

exile. Count Leſtoc himſelf acquainted me with every thing I have mentioned concerning his baniſhment, and furniſhed me alſo with the particulars of the revolution by which the Empreſs Elizabeth was fixed on the throne.

Count Munic, equally great as a courtier and as a general, acted in a different manner. He never complained. Both Ruſſians and foreigners had the greateſt reſpect for him.

General Munic was of the talleſt ſize; though advanced in years, and extremely thin, he had preſerved in the midſt of his misfortunes, a moſt agreeable countenance. He engaged all hearts by his politeneſs, and the gentleneſs of his diſpoſition.

Munic, had a daughter at the time of his baniſhment; who, as ſhe was too young to partake of her father's diſgrace, remained at St. Peterſburg. In this lady, a moſt beautiful form and all the charms of youth were at ſixteen years of age, united to the virtues, the gentleneſs, and the underſtanding of her father. The ſenſibility of M. de Witenhof could not reſiſt ſuch powerful attractions. He had the ribband of the order of St. Alexander Neuſki, and was not without views of ambition. He was not ignorant of the danger of marrying the daughter of the diſgraced general Munic; but he was in love, and obtained leave to be happy; nor has one day paſſed, in which he has not applauded his own reſolution.

Mad. de Witenhof was ſeparated from her father twenty years: ſhe knew him only by report, which publiſhed his misfortunes and his virtues. She lived at Riga, where her huſband was ſecond in command. On receiving the news of her father's recall, ſhe flew with M. de Witenhof to St. Peterſburg. The Emperor had juſt aſcended the throne, and joy prevailed throughout the capital; but the tenderneſs of Mad. de Witenhof made her regret the duty of appearing at court even for a moment: ſhe ſet out next day with her husband for Siberia. Munic, confined for twenty years paſt, had never received any

news

news of his daughter. He was returning from Siberia, unacquainted with his own deſtiny, or any of the events which had taken place during ſo long an interval. He was at this time more than fourſcore years old; his lady was with him. Mad. de Witenhof found her father in a mean habit made of ſheep's ſkin. Munic diſcovered his daughter by her tranſports, and for the firſt time ſhed tears. His lady, oppreſſed by the misfortunes of exile, attempted in vain to participate of the general joy: her organs, worn out by adverſity, were no longer ſuſceptible of pleaſure. I have had the honor of ſeeing this reſpectable family ſeveral times. The unhappy mother, though encouraged by the juſt regard which was paid to her huſband at St. Peterſburg, by his own prudence, and by the reſpect of the whole nation, was nevertheleſs in perpetual terror. Whenever the door was opened, her countenance betrayed marks of uneaſineſs.

All exiled perſons are not confined, as I have before obſerved. While I was at a manufactory in Siberia, where I came to get ſome things I wanted, made under my own inſpection, a man, whom I took at firſt for a Ruſſian peaſant, came into the ſame place. His countenance was pale, his beard long and diſguſting, his dreſs was ragged, and his whole appearance expreſſed the greateſt miſery. Obſerving that he fixed his eyes on me, and that there was a kind of uneaſineſs diffuſed over his ſingular countenance, I could not avoid being ſurprized. I went up to him, in order to make ſome inquiries; but how great was my aſtoniſhment, when under ſuch an appearance I found a man of extraordinary learning. He converſed with me in Latin upon the ſciences, upon government, and upon the intereſts of the European powers, *&c.* I ſoon found that that he was one of the unfortunate exiles who live in this country. I was going on with my converſation, when I obſerved a Ruſſian ſoldier come in, who turned pale on ſeeing me

with this man. As I was acquainted with the country, I winked upon the exile, who underſtood me, left off ſpeaking, without turning about, and ſoon after went away. I took care not to follow him, however deſirous I was of doing it. I ſearched for him in vain ſome days after, walking about in all places where I had hopes of meeting with him: I never ſaw him after, and imagine he muſt have been confined at leaſt for ſome time.

Baniſhment in Siberia is a kind of ſtate of reprobation; it makes a man ſo miſerable, that although he lives among his fellow-creatures, every body flies from him; no perſon dares to have any kind of connection with him; but this is not ſo much on account of the crime he is ſuppoſed to have been guilty of, as for fear of the government.

The leaſt unhappy of the exiles are ſuch as are allowed to go into ſervice among the Ruſſians; they live at leaſt with human beings. I have known ſome of theſe very well ſatisfied with their condition; living with merchants who had ſome regard for theſe unfortunate people. One of theſe exiles brought me one day a ſmall phial full of a liquor which he aſſured me was a ſovereign remedy againſt all diſeaſes. It may readily be imagined that I gave him whatever he aſked for it.

I have read in the works of ſome preceding travellers, that the exiles in Siberia were employed in hunting the animals which ſupply the Ruſſians with their beautiful furrs. I have never been a witneſs of this practice, but indeed it was impoſſible for me to ſee every thing. Beſides, the Ruſſians are in general ſo miſtruſtful, that when they are aſked any queſtions, even concerning matters independent of government, they always anſwer, *God knows, and the Empreſs.*

Of

Of the population, trade, navy, revenues, and land forces of Ruſſia.

THE power of a ſtate ariſes from its population; altho' in many countries this circumſtance is the leaſt object of the attention of government. Depravity of manners, luxury, and the wretchedneſs of the people, are the chief impediments to population; ſince it is well known, that unlawful connections contribute but little to the propagation of the ſpecies. Luxury, by increaſing our wants, makes us apprehenſive of an increaſe of family, and miſery often gets the better even of the deſire of procreation.

In northern countries, the climate furniſhes a freſh obſtacle to population: the regions of the Laplanders, of the Samoiedes, and all the northern parts of Ruſſia, have been always depopulated, and will ever be ſo, becauſe of the unfruitfulneſs of the ſoil, and the bad quality of the food theſe people are obliged to live upon: this food contains hardly any nutritious juice, and all nature in theſe climates ſeems to be in a ſtate of perpetual ſluggiſhneſs, in which ſcarce any active principles are to be diſcovered. On the contrary, the deſerts of the ſouthern part of Siberia, and of all Ruſſia, have been much peopled on account of their being ſituated in a more temperate climate. The emigrations of the Huns, and the Scythians, are proofs of this fact.

Almoſt all philoſophers are of opinion, that the conſtitution has leſs powerful influence in the northern, than in the ſouthern climates: the people of the north are leſs addicted to venery. Love is among them a chaſte and lawful paſſion, while it is always criminal among the people of the ſouth.

The

The obſervations I have made in Ruſſia are entirely contradictory to this opinion; they make the Ruſſians an exception to this general rule: and it ſhould ſeem that this apparent contradiction may be accounted for from moral cauſes. The women being left to themſelves, and ſuffered to live in idleneſs, the effects even of their moſt trifling paſſions muſt be powerful. Among the common people, men, women and children lie together promiſcuouſly, without any ſenſe of ſhame. Hence their paſſions being excited by the objects they ſee, the two ſexes give themſelves up early to debauchery. Although the baths weaken them at the time they make uſe of them, yet the flagellation they receive there promotes the circulation of the fluids, gives elaſticity to the organs *, and animates the paſſions. Theſe particular cauſes muſt neceſſarily produce great alterations in the effects reſulting from the climate.

That part of Ruſſia which I paſſed over, is the moſt populous: it bears a mean degree between the frozen regions of the north, and the temperate diſtricts of the ſouth. Theſe laſt countries are deſert, on account of the numbers of people who have removed from thence; beſides that they have been laid waſte by the conqueſts of Gengiſkan and his ſucceſſors. The route I took, is conſequently the fitteſt to give us an exact knowledge of the population of Ruſſia.

I went into no one houſe during the courſe of my journey, without inquiring at what age the parents had been married, what number of children they had had, how they had been brought up, and what diſeaſes they had been afflicted with: in ſhort, I neglected not the moſt trifling circumſtance from which any information might be gathered.

* Flagellation quickens the motion of the fluids, and increaſes the elaſtic power of the organs, although it deſtroys the ſenſibility of the nervous network before mentioned. The animal machine would ſoon be deſtroyed with them, if they did not uſe bathing ſo frequently.

Notwithſtanding

Notwithſtanding the varieties I found in the number of facts I collected, I may venture to affirm, that the young people are generally married about eighteen years of age; oftentimes much later, and in ſome inſtances at fifteen or ſixteen. Women bear children till fifty, but that is uncommon: I found they were more fruitful than I thought them to be, becauſe moſt of them are affected with the fluor albus, and that every where elſe this diſeaſe is a hindrance to population. Theſe people having but few wants, are not apprehenſive of the inconveniences of a numerous family: and indeed I have met with women who had had eighteen children; but ſuch fruitfulneſs as this may be conſidered as a phœnomenon. Theſe women however had but two or three alive out of this number. Several particular cauſes concur daily in depopulating theſe extenſive dominions.

The ſmall-pox carries off near one half of the children: this diſeaſe ſeems to have been communicated to this country from Europe. Several perſons have aſſured me of this remarkable fact, that the wandering Tartars to the ſouth of Siberia are ſcarcely acquainted with this cruel diſeaſe. They are ſo exceedingly ſhocked at it, that whenever any perſon is ſeized with it, he is left alone in a tent with proviſions, and the reſt of the band encamps in ſome other place. The Tartars who penetrate into Siberia are almoſt immediately attacked with this diſeaſe; many of them die, and ſuch as have reached their thirty-fifth year ſcarce ever eſcape. The more remarkable theſe facts appeared to me, the more pains I took to have them authenticated. I cannot, however, bring any other authority for them, than the teſtimony of ſeveral intelligent perſons whom I conſulted on this point, and who could have no motive for impoſing upon me.

Venereal diſorders are diffuſed throughout all Ruſſia, and in northern Tartary more than any where elſe. The men are much addicted to ſodomy in Ruſſia. Venereal diſorders prevail

among all the people from St. Peterſburg to Tolboſky. I found that they had penetrated as far as to the eaſtern regions of Siberia. This circumſtance is atteſted by Mr. Gmelin in his journey into Siberia. This traveller aſſerts, "That the "Neapolitan diſeaſe may be ſaid to be common to all the "inhabitants of the diſtrict of Argunſkoi, men, women, "old, young, and even children. The effects of it cannot "be ſeen without horror, and without a compaſſionate re-"flection upon the fatal conſequences the diſeaſe may be "attended with. The only medicine they take for it, is a "decoction of the bark of the white poplar, or of the larch-"tree with allum. The effect of this medicine being to turn "the virus upon the internal parts, muſt haſten the death of "many patients, who may perhaps be leſs wretched than thoſe "who ſurvive. The people are conſumed by degrees. Such "as are not already deſtroyed by this cruel diſeaſe, are ren-"dered unfit for labor, and reduced to be ſtarved to death in "a wholeſome and fruitful country *."

The ſame traveller found few houſes in the city of Tomſk, where there was not at leaſt one perſon affected with this diſtemper. He knew whole families which were ſeized with it †. It has run through all this diſtrict with the greater rapidity, on account of the debauchery which prevails in both ſexes, and becauſe there is no effectual remedy in uſe againſt it. Moſt of the children come into the world with this diſeaſe. We know that the fœtus is nouriſhed by a fluid paſſing through the ſubſtance of the mother's womb; and this fluid being impregnated with the virus, the infection muſt be communicated to the child, even although he may have been untainted at his firſt formation. This virus produces many other diſtempers, unknown in the poliſhed countries throughout the reſt of

* Gmelin, tom. i. pag. 256. † Gmelin, tom. i. pag. 157.

Europe, becauſe there the parents who are ſeized with it, have ſuch eaſy opportunities of relief. The little care the Ruſſians take of their children when ill, increaſes the mortality ſtill farther.

The ſmall-pox, venereal diſeaſes, and the ſcurvy, make ſo much havock in Ruſſia, that unleſs the government takes ſome meaſures to prevent their effects, they will put an end to the human ſpecies in this country.

Children who are really healthy, acquire remarkable ſtrength by the nature of their education. They are not only dipt in cold water, when baptized, even in the winter, but are likewiſe expoſed to the ſevereſt cold on coming out of their baths. The ſtrength acquired in infancy does not laſt long; their conſtitution is ſoon impaired by exceſſes in drinking brandy, and in women. I met with few old men in the courſe of my journey; ſome few I ſaw of ſixty and ſeventy years, and one of eighty, who was an old ſoldier. A ſmall cottage ſituated by the ſide of the road had been given him as a reward for his paſt ſervices. Sometimes the poſtilions ſtop at this hovel to reſt their horſes. As the man lived quite alone and forlorn in the midſt of theſe foreſts, he could not get either at women or brandy.

There are neither phyſicians nor ſurgeons among theſe people; nor is there in general any other remedy beſides their baths, except for an epidemical diſeaſe, which ſometimes prevails in theſe countries, and which I have never heard of in Europe. This diſtemper begins by tumors of the bigneſs of a ſmall apple; it becomes incurable in three days; but is eaſily cured if attended to at firſt. The cure conſiſts in chewing tobacco with ſal ammoniac, ſo as to make a poultice of it, which is applied to the tumor, after it has been punctured to the quick in ſeveral places. It were to be wiſhed that a more circumſtantial account might be given of this diſeaſe and its

cure; but as I have not been able to gain any farther information concerning this point, I thought proper to confine myſelf to what I found in my journal.

The working of the mines is alſo one of the chief reaſons of the depopulation of Ruſſia; more than one hundred thouſand men are employed in this buſineſs *, and it is univerſally known, that the working of mines is one of the cauſes of the deſtruction of the human ſpecies. This labor is not proper for any, except very populous ſtates; and is therefore leſs fit for Ruſſia than any other nation. Beſides, if we except the produce of the iron and copper mines, that of the gold, ſilver and lead mines is ſo trifling, that it ſcarcely pays for the charges of working them. It is true, theſe mines increaſe the coin, which is very ſcarce in Ruſſia; but gold and ſilver are imaginary riches: population, the cultivation of lands, and induſtry, conſtitute the eſſential riches of the ſtate, and of the ſovereign. The power of Spain is grown weaker ſince the expulſion of the Moors, merely becauſe the inhabitants of that kingdom have abondoned agriculture, in order to go and work the golden mines of Peru. The colonies which Spain has ſent into America have almoſt deprived ſome of the Spaniſh provinces of their inhabitants.

The empire of Ruſſia is continually depopulated, ſince the conqueſt of Siberia, by the numbers of inhabitants which are ſent into the deſerts of this vaſt province. Siberia may be more fatal to Ruſſia, than Peru has ever been to Spain. The Ruſſians loſe a great number of ſubjects without any compenſation for the loſs; while the Spaniards receive at leaſt the treaſures of Peru in return.

A friend of mine who has been a long time in Ruſſia, where his thoughts have been much taken up about the ſtate of this

* Voltaire, tom. i. pag. 52. & 54.

empire,

empire, has imagined that, in 1760, the number of its inhabitants might be computed at ſixteen or ſeventeen millions. Mr. Voltaire reckons the number in 1747, at twenty millions, and at twenty-four, including the Ukraine, Siberia, and the reſt of the conquered provinces *. But this famous writer in the ſame page makes this population much leſs conſiderable, by ſuppoſing that the Ruſſian empire is nearly as populous as France. Every body knows that that kingdom does not contain more than twenty millions; and indeed Mr. Voltaire in his firſt calculation explains himſelf thus: "In 1747, Ruſſia "contained ſix millions ſix hundred and forty thouſand males, "who paid the capitation. In this calculation, children and "old men are included †; but women and girls are not; nor "boys born in the interval between the beginning of one "regiſter, and the making up of another. Treble the num-"ber of taxable perſons, including women, and girls; and "the reſult will be near twenty millions." This calculation is excluſive of the inhabitants of ſuch provinces as do not pay the capitation; which Mr. Voltaire reckons about four millions; and is made only by trebling the ſix millions ſix hundred and forty thouſand males.

In this computation the number of boys born in the interval between one regiſter and another is included, without attending to the number of perſons who die; a number, which in Ruſſia is much greater than that of the perſons who are born, ſince it has been already ſhewn that this country is daily depopulated. It appears therefore, that in order to determine the exact number of inhabitants in 1747, it will be ſufficient

* Mr. Voltaire gives the ſtate of population in Ruſſia, tom. i. pag. 51, and the following: he has taken it from the calculation made in 1747.

† From this calculation it appears, that all males pay the capitation. There have been freſh regulations ſince made, by which all perſons under ten years of age, are exempted from this tax.

to double the number of taxable perſons: the reſult will then be, in even numbers, thirteen millions, and ſeventeen millions, including the inhabitants of the provinces who do not pay the poll-tax. In this calculation indeed, it is taken for granted, that the number of women and girls is equal to that of men and boys; although many people think the number of women and girls is generally greateſt *. It is alſo ſuppoſed, that in the interval between one regiſter and another, the number of births is equal to the number of deaths; whereas, it is evident from all which has been ſaid, that the number of deaths is much more conſiderable. The number therefore of the inhabitants throughout the empire of Ruſſia in 1747, may be taken at ſeventeen millions. The famous writer I have quoted, ſeems to have made all theſe obſervations. Suppoſing the empire of Ruſſia to contain nearly as many inhabitants as the kingdom of France, it may readily be concluded from theſe ſeveral calculations, that the number of inhabitants in Ruſſia in 1760, was leſs than ſeventeen millions, including all the males, women, girls, and all perſons not ſubject to the poll-tax in the various provinces. Whatever ſuppoſition we may admit of, the number of inhabitants could never amount to nineteen millions in 1760, without exaggerating the population.

Peter I. tried all poſſible means to increaſe the trade of his empire: he made commercial treaties with China, Perſia, and ſeveral European powers. Tobolſky, the capital of Siberia, was the center of the Chineſe trade; this was carried on by means of the caravans which ſet out from Moſco, and were three years going and coming. The diſhoneſty of the Ruſſian and Chineſe merchants made this trade very languid from the firſt; and the diſputes which have ariſen at divers times between the two powers, have entirely put a ſtop to it. The

* Some people think the number of men and boys moſt conſiderable.

laſt

laſt differences have happened in conſequence of the revolution which took place in 1757, in the nation of the Calmuck Zongors, after the death of Galdan Tcheren in 1746. He was Kam of the Tartars inhabiting that part of the north of Siberia ſituated between Siberia and China, near the origin of the Irtyſz. This whole nation has been exterminated by the Chineſe. All ſuch as have eſcaped, have taken refuge on the borders of the Volga, and put themſelves under the protection of Ruſſia.

The Ruſſians have always endeavoured to extend their dominions towards the ſouth: in 1761, they tried to make themſelves maſters of part of the territories, which the Calmuck Zongors had deſerted. The Ruſſians were fitting out a ſmall armament for this purpoſe while I was at Tobolſky, and I learned in France, that the Chineſe had obliged them to lay aſide their deſign. The chief intention of the Ruſſians was to ſeize upon the mountains, where they expected to find ſome mines of gold.

The Ruſſian trade carried on with Perſia, has been equally unſucceſsful. The Engliſh had eſtabliſhed a company, in order to carry on this trade by means of the Caſpian ſea: but the Ruſſians took umbrage at it; and required that the ſailors ſhould be Ruſſians, and that the ſhips ſhould be built by the natives of the country. This trade was quite deſtroyed by the diſturbances which happened in Perſia. A few Armenians and Tartars of Bucharia, ſtill continue however to bring into Ruſſia ſome lapis lazuli, raw ſilk, and ſome wrought ſilks; and carry back with them furrs and leather. But this traffic is very much confined, as well as the Turkiſh trade, which is entirely in the hands of the Coſſacks of the Ukraine. They ſail down the river Don in boats as far as the city of Azoph, where they exchange furrs and the caviar, for coffee and Turkiſh ſtuffs.

Moſt

Moſt of the canals projected for the facility of commerce, remain unfiniſhed: the reſt have not proved ſo uſeful as was expected: the only canals which deſerve to be mentioned, are, that of Ladoga, and that of Wyſnei-Woloczok. One may travel by means of theſe from St. Peterſburg to the Caſpain ſea; but with this inconvenience, that the veſſels are two years going and coming, becauſe they ſail againſt the current; theſe canals therefore are ſeldom uſed for this purpoſe.

The canal of Wyſnei-Woloczok joins the Volga, with the river Mota, which empties itſelf into the lake Ilmen, from whence the river Wolchow riſes, which communicates with St. Peterſburg by the canal of Ladoga. This laſt canal is of the greateſt conſequence to the city of St. Peterſburg, in bringing up the proviſions neceſſary for the ſubſiſtence of the inhabitants. The bottom of the lake Ladoga, or Oz-ladoſkoe, being compoſed of a very looſe ſand, there are ſuch banks formed of it by ſtorms, that the lake is not navigable.

It appears from all we have ſaid, that the land-trade in Ruſſia is very inconſiderable. The vaſt extent of land and the deſerts which muſt be croſſed, make this trade even almoſt impracticable. All theſe facts are known to intelligent men, who have been at St. Peterſburg, and at Moſco. M. Voltaire gives us the ſame idea of this trade *, and I have been confirmed in it, by penetrating into the inland parts of the Empire. Former travellers have been miſtaken upon this point, becauſe in their time it was a new object, with which the whole nation was much taken up, and from which great advantages were then expected.

On the contrary, the ſea-trade which Ruſſia carries on with Europe is extremely beneficial to the nation, becauſe the exportation is always more conſiderable than the importation.

* Tom. ii. pag. 211.

In

In 1749, the exportation of the different articles ſent out from the ports of Ruſſia, was valued at three millions of roubles: and the importation at two million nine hundred thouſand roubles: The number of ſhips which came up to St. Peterſburg, the chief port of Ruſſia, was two hundred and ſixty, in the year 1744; two hundred in 1745; two hundred and fifty-two in 1750; and two hundred and ninety in 1751; ſo that we may reckon the number of veſſels coming in to St. Peterſburg annually, two hundred and fifty.

The Ruſſians * trade with the Swedes, the Danes, the inhabitants of Lubeck and Hamburg; with the Engliſh, the Dutch, and the French. More than half this trade is carried on by the Engliſh. Among the other nations, the Dutch ſend the greateſt number of ſhips into Ruſſia. There are few French veſſels to be ſeen in the Ruſſian ports. The French carry on this trade, only through the channel of other nations, by which means both parties loſe the advantages of a direct commerce.

* *Mercantile articles exported from Ruſſia.*

Sables
Foxes, black and white, &c.
Ermins
Caſt lambs
Tygers
Black and white bears
Wolves
Common martens
Wild cats
White hares
Beavers
Lynxes
Leather
Greaſe
Honey
Pot-aſh and woad-aſh
Rhubarb
Pitch
Linſeed oil
Iſinglaſs
Caviar
Salt fiſh
Roſin
Flax
Hemp
Thread
Wool
Matting
Canvaſs for ſails
Maſts
Iron
Copper.

The

The Ruſſians are not expert traders: the merchants are too dependent upon the ſovereign, and upon perſons in office. They have neither capital nor credit enough to deal largely. The principal merchants of Ruſſia are no better than agents to foreign merchants. Beſides, the ſovereigns in Ruſſia carry on ſeveral branches of trade on their own accounts. They have reſerved the monopolies to themſelves, which they diſtribute among the nobles. The mention of theſe facts is ſufficient to point out the inconveniences of ſuch an adminiſtration, and to ſhew that the Ruſſians might carry on a more profitable trade.

The revenues of Ruſſia are conſiderably increaſed ſince Peter I. Although theſe revenues vary according to the circumſtances of the times, we may ſtill form a pretty exact idea of them from the following account *, which I have taken from the ſtate of the finances communicated to me by one of my friends.

Each taxable perſon pays into the royal treaſury ſeventy copecs for the poll-tax, and all the peaſants belonging to the Empreſs pay forty copecs more. In 1747, Mr. de Voltaire computed the number of males paying the poll-tax, at ſix millions ſix hundred and forty thouſand †. Suppoſing an equal number of inhabitants at preſent in Ruſſia, the produce

* *Goods exported from France into Ruſſia.*

The French ſend into Ruſſia, gold, ſilver, and ſilk ſtuffs, flax, cotton, and varieties of woollen drapery and ſtuffs, for men and women, ſtockings, boots, ſhoes, hats, feathers, bags and buttons; all ſorts of hard ware and toys, gloves, watches, pins, ſpectacles, combs, belts, handkerchiefs, and many things of the ſame kind: wine, brandy, vinegar, oil; all ſorts of ſpices; china, cheeſe, herrings, anchovies, ſugar, cards, paper, glaſſes, looking-glaſſes, pipes for ſmoking, wax tapers, tobacco, &c.

† Voltaire, tom. i. pag. 55.

of

of the poll-tax may eaſily be calculated. From the ſtate of the finances which I have had in my own poſſeſſion, I have taken a copy of the reſt of the revenues of Ruſſia mentioned in the note *, and I find that the whole revenue of the empire, in even numbers, amounts to thirteen million four hundred thouſand roubles, or about fourteen hundred thouſand roubles more than in the year 1725.

Before the time of Peter I. the Ruſſians had nothing but barges, or ſuch kind of ſmall ſhipping, which they uſed on the rivers Volga and Don. At preſent the Ruſſians have docks at Archangel, at Cronſtat, at St. Peterſburg, at Revel, and many ſhip-

* *Revenues of the Ruſſian empire.*	Roubles.
Poll-tax, 6,640,000 males, at 70 copecs	4,648,000
The demeans of the ſovereign, for 360,000 peaſants at 40 copecs over and above the poll-tax	144,000
Annual produce of the public houſes, from the ſale of beer and brandy	2,000,000
Sea and land tolls, and the exciſe of St. Peterſburg, Archangel, Wiburg, Narva, Revel, and Riga	3,150,000
Iron and copper *	240,000
Pot-aſh and woad-aſh	70,000
Rhubarb	30,000
Tar, and oil of fiſh	180,000
The ſalterns	1,400,000
Stampt paper and the ſtamp	200,000
The baths pay a tax which produces	14,000
The trade of canvaſs for ſhips †	110,000
The revenue of the coin	250,000
The revenue of the port	330,000
The trade of tobacco	76,000
The duties on the corn trade	160,000
Conqueſts in Sweden	100,000
Conqueſts in Perſia	300,000
Total	13,402,000

* This is the produce of the mines of the ſovereign's demeans.

† This traffic has been granted excluſively to one private man, who pays this revenue out of it to the crown.

ſhipwrights of the nation are kept in employment. It appears from the ſtate of the naval forces in 1756, compared to that which

This ſtate of the Ruſſian revenue may be liable to ſome objections, becauſe it muſt neceſſarily receive different alterations, according to the changes of times and circumſtances; but if the revenue is leſſened in ſome particulars, it is increaſed in others; and according to the preſent ſtate of the kingdom, the general reſult will always be nearly the ſame. I thought it beſt to give the account of the Ruſſian revenue, as I found it in the abſtract which was given me, without making any alteration, except with regard to the number of males paying the poll-tax, for they were confounded with the women. It appears therefore, that in 1767, the revenue of Ruſſia in money might be ſettled at thirteen million four hundred thouſand roubles in even numbers. M. de Voltaire found by a ſtate of the finances of the empire in 1725, that, including the tributes paid by the Tartars, all the taxes and duties in money, the ſum total of the revenues amounted to thirteen millions of roubles, excluſive of the taxes in kind *.

Since the year 1725 however, the cuſtoms have been conſiderably increaſed by the care that has been taken to prevent ſmuggling. I have reckoned the number of peaſants belonging to the crown, and which pay forty copecs more than the ordinary poll-tax, at 360,000, whereas Mr. Voltaire makes them much more conſiderable in 1725. I have not included in this ſtate, the revenue ariſing from the furrs which are brought from Siberia, any more than that of the drugs; but to make up for this, I have reckoned the number of males paying the capitation, at ſix millions ſix hundred and forty thouſand, as Mr. Voltaire calculated them in 1725, when it has been ſhewn, under the article of population, that this number muſt at preſent be very conſiderably leſs. It is likewiſe evident, that for this reaſon it was propoſed to make a new regulation, in order to increaſe the poll-tax forty copecs per head; but this regulation has never been carried into execution; and indeed, the Ruſſians are not always able to pay the common taxes, as they are now rated. The arrears from 1724 to 1747 amounted to two million five hundred and four thouſaud roubles, which the Empreſs Elizabeth gave up to her ſubjects.

I have included in the above account, the revenue ariſing from the ſale of the pot-aſh and the woad-aſh; but I have been aſſured in Ruſſia, that this traffic exiſted no more, or at leaſt that it was conſiderably leſſened, on account of its being hurtful to the empire, by deſtroying the foreſts which ſtood the neareſt at hand for felling; a fact, of which every one muſt be convinced.

The number of peaſants belonging to the crown, leſſens, not only becauſe of the depopulation, but alſo becauſe it is a cuſtom among the ſovereigns of Ruſſia, to reward their ſubjects by giving them a certain number of peaſants. This fact is univerſally known. The furrs of Siberia do not produce ſo large a revenue in money as it

* M. de Voltaire, tom. i. pag. 59.

which was given by Mr. Strahlenberg in 1720 *, that the navy of Ruſſia has been conſiderably leſſened ſince that time. Some

* The author wrote in 1730. Tom. ii. pag. 115. and 123.

has been thought. Theſe furrs are conveyed from the diſtance of fourteen hundred or even two thouſand leagues, into the magazines of Moſco and St. Peterſburg; in this courſe they paſs through ſuch a variety of hands, that the fineſt of them are ſcarce ever brought to theſe magazines. Beſides, the countries from whence theſe ſkins come, being daily more and more frequented by merchants who are ſettled in Siberia to carry on this trade, and by the number of military perſons who are ſent there; it is plain, that theſe people will rather ſell their fine furrs, than give them up to thoſe who are commiſſioned to raiſe this kind of tax. The private people in Ruſſia get the beſt part of their furrs by the help of the merchants, or by ſome of their friends in the army; and I know that many of the furrs belonging to the crown, grow rotten in the magazines in Siberia and at Moſco, for want of ſale.

In the account of the revenues of Ruſſia I have taken no notice of the profits ariſing from the ſale of drugs, becauſe I did not find it in my notes. The crown has reſerved to itſelf the profit of all the eſtabliſhments for apothecaries formed throughout theſe dominions, as well as the diſtribution of the medicines; the crown appoints all the perſons employed in this buſineſs; ſupplies all the drugs, and in ſhort furniſhes all the expences, and alſo receives all the profit. Although the expences of the crown are very conſiderable on this account, it is certain that when all charges are paid, the crown gains at leaſt the ſtoppages made on the troops for their medicines, and I have been aſſured that the profits were ſtill greater; but the apothecaries, having all fixed ſalaries, are not ſufficiently intereſted, to endeavor to increaſe pharmaceutical knowledge, becauſe they are never employed on their own accounts. It is alſo evident, from the preceding ſtate of the revenue, that the ſovereign has monopolized ſeveral branches of trade, whereas it is the buſineſs of the monarch only to protect commerce and make it flouriſh. Theſe abuſes are directly contrary to a good adminiſtration, and they ſubſiſt only becauſe it is impoſſible to alter every thing at once.

I have reckoned in this eſtimate, the revenue of the conqueſts on Sweden at one hundred thouſand roubles only whereas thoſe provinces brought a conſiderable revenue to Sweden; but they are now no longer ſubject to the poll-tax, and this moderate revenue is the produce of the imperial demeans of Ruſſia: theſe revenues are much diminiſhed by the grants that have been given of theſe lands to ſeveral individuals.

The circumſtantial account I have given of the revenue of Ruſſia, gives us an idea of the real riches of this kingdom, and its reſources, by ſhewing the nature of their taxes. The obſervations I have made upon this revenue, ſeem to prove that they may be ſettled at thirteen million four hundred thuſand roubles in money, I have known ſeveral perſons very well acquainted with Ruſſia, ſome of which

Some ſhips, however, are ſtill built every year in the ſeveral ports of Ruſſia; but the number of theſe muſt be proportionally diminiſhed, for reaſons which will be ſeen hereafter. The ſhips of war are ſtationed at Revel and Cronſtat, and the ſmall veſſels at St. Peterſburg; but theſe are not good harbors. The harbor of Cronſtat is expoſed to three great inconveniences, according to M. de Strahlenberg *. "The ſea is not wide enough "before the port, nor very ſafe, on account of the number "of rocks and hidden ſand-banks ſurrounding the harbor, ſo "that ſhips cannot come out of it but when the wind is in "certain quarters. Secondly, the ice remains too long there, "and the ſea is not forced from it till near the end of May. "Thirdly, the ſhips rot very faſt in theſe ports, becauſe they "lie always in freſh water: (I have been aſſured, that they "did not laſt longer than ten years.) The port of Revel is "too much expoſed to ſtorms, ſo that ſhips do not ride in "ſafety there, as three of the largeſt veſſels periſhed in one "day even in the very port."

In the time of Peter I. many ſhips were built of deal; at preſent the principal parts of them are made of oak, and

* Strahlenberg, tom. ii. p. 127. Theſe facts are confirmed by all perſons who have been at St. Peterſburg.

valued the revenue of the ſtate at fifteen million of roubles, and others at thirteen or leſs; but the latter took into their account the deficiencies.

The coin is very ſcarce in Ruſſia, not only for want of the firſt materials, but alſo becauſe the number of roubles decreaſes annually. As this circumſtance ſeemed to deſerve the attention, the government endeavoured to diſcover the cauſe of it. It was found that the peaſants and trading people who went into the towns, carried back with them in ſpecie the profits ariſing from the ſale of their proviſions and goods, that they buried their fortune under ground, in order to conceal it from thoſe on whom they were dependent, and that moſt of them dying without revealing the ſecret, this money was thus loſt to the ſtate. The endeavors which have been made to obviate this inconvenience have proved fruitleſs; for it will ſubſiſt as long as the people remain enſlaved.

moſt

moſt of the veſſels are entirely built of this wood, which is found about the confines of Cazan *. This town is more than four hundred leagues diſtant from St. Peterſburg, taking the courſe of the rivers upon which the wood is conveyed. In this voyage it is neceſſary to aſcend the Volga for an extent of two hundred and ſixty leagues, which makes the conveyance of the materials for ſhip-building, extremely difficult. For this reaſon ſome deal is ſtill made uſe of; and it is well known that this wood is fit only for maſts, and that it is extremely bad for every other part of the ſhip. It ought to be leſs uſed in Ruſſia than any where elſe, becauſe there is freſh water in the chief ports of this empire, ſo that the veſſels rot very faſt.

From the account which has been given me of the maritime force of Ruſſia †, I find that in 1756, they conſiſted of twenty-two

* I have been aſſured that there was ſome oak brought alſo from Archangel, but in ſmall quantities.

† *State of the ſhips of war which compoſed the naval powers in Ruſſia in* 1756.

Ships of the line in the harbor of Cronſtat.	Year in which they were built.	Number of guns they carry.
Elizabeth, for repair		110
Zachariah Elizabeth	1747	99
Saint John Chryſoſtom	1751	99
Saint Nicholas	1754	80
Name unknown	1755	80
Leſnoy, in bad condition	1743	66
Sergius, in bad condition	1747	66
Raphael Archangel, in bad condition	1745	66
Uriel, in bad condition	1749	66
Gabriel, in bad condition	1749	66
Ingermania	1752	66
Name unknown	1754	66
Name unknown	1754	66
Pantlemont, in bad condition	1740	54
Name unknown	1756	66
Name unknown	1756	66

two ſhips of the line, ſix frigates, two bomb-ketches, two packet-boats, two fire-ſhips, and ninety-nine galleys.

According

	Year in which they were built.	Number of guns they carry.
At the port of Revel.		
Saint Alexander Newſchi, in bad condition	1749	66
Moſchwa	1750	66
Saint John Chryſoſtom, the ſecond, in bad condition	1749	66
The Northern Eagle, very bad	1735	66
Schluſſelburg	1751	54
Verakil	1752	54
Total of firſt rate ſhips	22	
Frigates in the port of Cronſtat.		
Jegudice	1746	32
Sealfil	1746	32
Name unknown	1754	32
Name unknown	1754	32
At the port of Revel.		
Michael Archangel	1748	32
Kreyſel	1751	32
Bomb-ketches.		
The Thunder	1752	10
Jupiter	1752	10
Packet-boats.		
The Elephant	1752	36
Name unknown	1754	36
Fire-ſhips.		
Mitau	1747	
Holland	1747	

Galleys.

According to M. Strahlenberg, there were on the Baltic in 1730, thirty-ſix ſhips of the line, twelve frigates, nine ſmall frigates, and two hundred and forty galleys.

When the ſhips companies and the galleys are complete, the number of officers, ſoldiers and ſailors, amounts to twenty thouſand two hundred and thirty-nine, and the perſons employed in the admiralty, with the workmen in the ſeveral ports, to nine thouſand eight hundred and ſeventy-nine; but the number of ſoldiers and ſailors is by no means complete.

The officers are but little acquainted with the theory of navigation, and ſtill leſs with the practice; becauſe they ſeldom go to ſea. The ſhips ſurrounded with ice, and lying in freſh water, periſh in the ports. A great number of ſhips have been condemned, before one ſail has been hoiſted upon them, and many officers have gone through their ſeveral ranks, without having ever been once on board a ſhip. Beſides, the Ruſſians are too much afraid of the ſea, ever to become good ſeamen; they have none who deſerve to be called ſailors; and the empire of Ruſſia will never have any, till ſhe carries on trade by her own ſelf.

The land forces of Ruſſia are divided into troops of the field, and troops of government. Theſe two bodies are entirely different, the laſt forms a kind of militia, which is diſtributed on the borders of Tartary, and in the ſeveral provinces of this vaſt empire; the great extent of which requires a large body

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Galleys.

Galleys of 22 rows	-	-	-	-	32
Galleys of 20 rows	-	-	-	-	22
Galleys of 16 rows	-	-	-	-	45

Each galley carries ſix ſmall iron guns, and on the forepart, two four and twenty pounders.

There are two oars in each row, and five ſoldiers to each oar. The galley is commanded by one officer, who has a pilot, and twelve ſailors under him.

of

of troops, to keep the people in order, and protect Ruſſia from the incurſions of the Tartars. Theſe troops are kept for theſe purpoſes only; they are never brought into the field, and are not fit to act againſt regular troops, being ill ſubſiſted, and ſtill worſe diſciplined. They are diſpoſed in a garriſon in the provinces ſituated in Europe, or in the neighbourhood, and towards the borders of Tartary, that they may be readily brought together, in order to aſſiſt the different parts of the ſtate, or to attack the powers at war with Ruſſia.

I find by the account of the troops of this empire, that the eſtabliſhed army amounts to three hundred and thirty-one thouſand five hundred men. It muſt vary a little now and then, as it appears from the ſeveral ſtates of the army I have ſeen. In 1750, the regiments of infantry conſiſted of two thouſand two hundred and ninety-eight men; and the regiments of cavalry, and of the provinces, were leſs numerous than thoſe of which I have given an account. The regiment of body-guards is no longer exiſting, having been broken by Peter III. Upon the whole, theſe trifling alterations have no effect upon the general reſult, which is always nearly the ſame. Therefore I compute the eſtabliſhed army in Ruſſia in even numbers at 330,000 men *.

In

* *Military ſtate of the troops in Ruſſia, ſuppoſing the regiments complete.*

Houſhold of the Empreſs.

Body-guards, or Leibz company	- - -	300
Life-guards, cuiraſſiers	- - - -	846
Horſe-guards	- - - - -	1223
Foot-guards { Regiments of Preobragenſki	- -	3245
——— of Semenowſki	- - -	2436
——— of Iſmaelowſki	- - -	2436
The grand duke's regiment	- - -	846
Six regiments of infantry of eight hundred and forty-ſix men	-	5076
	Total	16408

In this number are included all the mechanics employed in the regiments, farriers, locksmiths, carpenters, &c. the batmen, the servants of the artillery, and the servants of all the officers in the army; which servants are called Denschik. There is a great number

This body of troops being entirely designed for the sovereign's guard, never takes the field. These several regiments are always in garrison near the monarch's residence, to be entirely at his disposal on all occasions.

Russian field infantry.

The Russian infantry consists of forty-six regiments *. Each regiment contains three battalions, and each battalion twelve companies of fusiliers, and two of grenadiers. The number of grenadiers and fusiliers is 2128; and the whole regiment including officers, &c. consists of 2637 men †. But all the regiments are not so numerous: reckoning them at 2637 men, the forty-six regiments when complete will amount to 121,302.

Each regiment has four three-pounders along with it; and four small mortars charged with grenades.

The Russian cavalry consists in a few regiments of horse grenadiers, some cuirassiers, dragoons and hussars.

Russian field cavalry.

Four regiments of horse-grenadiers, of 2489 men	- -	9956
Four regiments of cuirassiers, of 1350 men	- -	5400
Twenty-six regiments of dragoons, of 1350 men	- -	35100
Six regiments of hussars, one with another	- -	12860
	Total	63316

Fortification and artillery.

Fortification - - - - -	750
Miners - - - - -	210
Artillery and bombardiers - - -	10000
Total	10960

* According to the different returns I have seen, the infantry has sometimes consisted of 52 regiments; but it appears to me that some of those regiments have been incorporated with others, belonging to the sovereign's guard, which was formerly less numerous.

† The list of these will be given in the account of the expences of each regiment,

number of theſe: they are made ſoldiers after they have ſerved a certain time. All the ſoldiers employed to guard the priſoners and criminals are likewiſe included; but I have not reckoned the irregular troops: theſe are compoſed of Coſſacks, Zaporovians, Calmucks, Walacks; which are of uſe only in war time. They have no pay, but live upon their own plunder.

Ruſſian infantry of government, which never takes the field; a kind of militia.

Twenty regiments of 1344 men, in the countries conquered from Sweden -	26880
Thirty-two regiments diſtributed in the ſeveral parts of Ruſſia, Siberia, &c. They all, except four, conſiſt of 1328 men, three of the four are of 664 men, and one of 1992 - - - -	41168
Twenty regiments of 1077 men, diſtributed in the Ukraine -	21540
One regiment on the lines of the Ukraine - - -	1248
Total	90836

Dragoons.

Four regiments of 1056 men - - -	4224
Three regiments of 1220 men - - -	3660
One ſquadron at Moſco, of - - - -	546
Total of the cavalry of militia	8430

Recapitulation.

Houſhold of the Empreſs - - -	16408
Field infantry - - - -	121302
Field cavalry - - - - -	63316
Fortification, miners, artillery, bombardiers - -	10960
Infantry which never takes the field - - -	90836
Cavalry of militia - - - - -	8430
Total -	311252
We have ſeen before, that the navy, reckoned complete, including officers and ſailors, amounts to - - -	20239
Total of land and ſea forces	331491

Theſe troops are not formidable of themſelves, being generally ill mounted, and having no kind of diſcipline; but they are very terrible on account of the robberies they commit: they plunder and ravage all the countries through which they paſs, and practiſe the moſt ſhocking cruelties. They are of but little uſe to the Ruſſians in defending their camps, and are often very fatal to their army, by the conſumption of proviſions and forage. They have always a number of horſes with them to carry off the booty. In the ſtates I have ſeen of the army of Ruſſia, this body of troops amounts to thirty or forty thouſand men, ſometimes more; if theſe are added to the military eſtabliſhment, the number of troops in Ruſſia will amount to about three hundred and ſixty thouſand men.

It appeared to me at firſt incredible, that there ſhould be ſuch a number of troops in a kingdom ſo much depopulated, and whoſe revenues are ſo moderate. I have had the military returns in my own poſſeſſion, with the names, and account of the regiments. From theſe it is evident, that the army amounts to 330,000 in even numbers, excluſive of the irregulars. Mr. de Voltaire finds it nearly the ſame in 1725 *. But how the Ruſſians can contrive to maintain ſuch a conſiderable body of troops; whether it is neceſſary to the ſovereign of this empire; or whether he ſhould not rather leſſen the military eſtabliſhment, conſidering how much the empire is depopulated; and if the ſovereign is obliged to maintain ſuch a body of troops in time of peace, whether this can be admitted as a real proof of his power; are objects, the examination of which appeared to me ſo intereſting to mankind, to Europe, and perhaps to Ruſſia itſelf, that I took a great deal of pains to gain ſome inſight into them.

* Mr. Voltaire reckons the number of ſea and land forces, at 339,500 in the year 1725. tom. i. pag. 59.

In order to proceed with regularity, it is neceſſary to conſider the empire of Ruſſia in the ſeveral relations it bears to Europe, and to its Aſiatic neighbours; and we muſt alſo pay ſome attention to the extent of this realm. The political ſtate of Ruſſia with reſpect to Europe is well known. Several authors have written upon the connection this empire has with the neighbouring Tartars; but whether the political ſtate of theſe ſeveral powers has undergone any alteration or not, it is abſolutely neceſſary to ſpeak of it here. Beſides, that by this means, the authenticity of the facts related by preceding travellers will receive farther confirmation.

As we get farther diſtant from St. Peterſburg coming near to Kamtſchatka, the people are under leſs ſubjection, not only on account of the difficulty of ſending troops and proviſions towards the eaſtern part of this empire, but alſo becauſe the troops which are ſent, being not within reach of the ſovereign, the army, the governors, and all perſons in office, abuſe the authority they are inveſted with. Theſe people are always ripe for a revolt; an inconvenience inſeparable from all dominions of a vaſt extent. There are even in Siberia ſome people whom the Ruſſians have never been able to ſubdue ſince the conqueſt of that province. Among theſe are the Tchouktchi. The Joukagirs their neighbours, and the Koriachs are kept in tolerable ſubjection. All theſe people inhabit the extremity of the north eaſt of Siberia. Altho' they can be of little advantage to Ruſſia, yet that power is conſtantly at war with ſome of them in order to bring them into ſubjection. The Tchoutkchi are the moſt ſtubborn and cruel enemies the Ruſſians have. They have always preſerved their liberty, tho' the Ruſſians have the ſuperior advantages of fire-arms, and diſciplined troops to act againſt them. As the Ruſſians however were continually ſending freſh troops, they would have deſtroyed or ſubdued them in proceſs of time, if their neighbors the Joukagirs, had not warned.

warned them that ſuch an event would certainly take place, if they ſtill continued to uſe nothing but arrows againſt the fire-arms of the Ruſſians. They adviſed them therefore to fall upon the Ruſſian artillery as ſoon as they ſhould meet with it, and to make themſelves maſters of it; aſſuring them they might eaſily compaſs this point, as the artillery was never very numerous. The affair turned out as the Joukagirs had foretold. Some years before I came to Tobolſky, a body of Ruſſians marched againſt the Tchouktchi: the Ruſſian general ſent a ſmall detachment forwards with ſome artillery: theſe troops were attacked and ſlain when they little expected it; a few ſoldiers only eſcaping to carry the news to the Ruſſian general; who advanced immediately againſt theſe people, was beaten, and obliged to ſue for peace. It was agreed by both parties, that the chiefs and ſome of the troops ſhould meet together unarmed in a hamlet near the two armies. The Tchouktchi adhered ſtrictly to the terms of convention; the Ruſſians came to the appointed place to all appearance without arms; but they had concealed under their clothes a kind of cutlaſs, which the Ruſſian peaſants always carry about with them. The Ruſſians agreed to every propoſal the Tchouktchi made, and inticed them to drink ſuch a quantity of brandy, that they were ſoon drunk; ſo that the greater part of them were killed while they were aſleep. The Ruſſians immediately marched and attacked the army of the Tchouktchi, which eſcaped into the mountains, their prince and the principal chiefs having been ſlain in the maſſacre the Ruſſians had made of the troops of this nation. I was informed of this affair by a young prince, nephew of the chief of the Tchouktchi; and the truth of it was confirmed by the Ruſſians who were my interpreters. The Ruſſians had brought him priſoner to Tobolſky, where he had lived unfortunate, although not confined: he was maintained by the governor. This unhappy

prince

prince, anxious for the recovery of his liberty, had desired me to take him away along with me, as my servant, and sent me a petition for that purpose, which he had caused to be writ in Latin, that I might understand it. The Russians were still engaged in carrying on a war against these unfortunate people in the year 1761, instead of leaving them at peace among their frozen mountains.

Most of the other people, as the Kamtschadales, the Jakouti, the Tungouses, although subdued, are still always upon their guard against the Russians: the Russians having sent some engineers to turn the course of the river Amour, and examine whether a navigation might not be established upon it; the people who dwell on the borders of this river, obliged them to lay aside their design.

Many of the Tartar hords inhabit the countries situated to the south of Russia: they oblige the Russians to keep a considerable body of troops constantly upon these borders, from the lake Baikal, as far as the confines of Poland. The Russians have even constructed in most of these places, lines of circumvallation, and forts at small distances from each other. These precautions are necessary to defend the empire from the incursions of the Tartars, and to maintain such as have been already conquered by the Russians, in proper subjection. Most of these Tartars wander from place to place, and live on plunder. They have ever been troublesome to the Russians in this part of the empire. Notwithstanding the lines and forts, they penetrate readily into Russia, when they advance in large bodies: they then plunder the villages, while the troops nearest at hand are collecting together, and go off with the spoil as soon as these troops appear; so that the deserts of the southern part of Russia, and chiefly of Siberia, are the most powerful obstacles the Russians can oppose to these people: these regions being uninhabited, there are no villages for the Tartars to plunder;

most

moſt of them not daring to advance into the inward parts of the country, becauſe of the number of troops the Ruſſians always keep upon theſe borders; while the Ruſſians endeavor always to live in peace with the reſt of the Tartars.

The Ruſſians however, have great advantages over the Tartars, who for the moſt part have nothing but arrows to act with againſt the fire-arms of the Ruſſians. There are ſome nations among theſe wanderers who are not even acquainted with the uſe of fire-arms; but all the Tartars are warlike and brave. An event, which I have learnt ſince my return to Paris from the chevalier de St. Pierre, proves that ſome of them are totally unacquainted with fire-arms; and at the ſame time ſhews what kind of men the Ruſſians have in their neighbourhood. A ſtrong detachment of theſe Tartars advanced ſome years ago, to the frontiers of Siberia; the commandant of one of the Ruſſian forts having eſpied them, and not knowing what was the intention of this body of Tartars, ſent to let them know he would fire upon them, if they did not retire. The Tartars having aſſembled, held a council together, and ſent afterwards to deſire the commandant would fire upon them, which was done immediately. Several of them having been killed by one cannonade, they went a little farther off, held another council, and ſent to deſire the commandant would fire again: they retreated a little farther, and did not quit the ground till after the third cannonade. This fact ſhews, that if theſe people were inſtructed in the art of war, they would become formidable to the Ruſſians.

The revolution which has taken place among the Calmuck Zongors *, will give us ſtill a farther idea of theſe people. This nation was become ſo powerful under the reign of Kal-

* According to ſome authors, Calmuczs Zungors, Kalmuks, or Calmucs Dſongars.

dan-

dan-Tcherin their Kam, that the Chineſe and the Ruſſians were both afraid of this prince. He died in 1746; and a civil war aroſe immediately after between his ſucceſſors, which cauſed the ruin of this nation. The Chineſe weakened it at firſt, by eſpouſing alternately the cauſe of each of the pretenders to the crown; and after a ten years war in 1757, they cruſhed the new Kam, and deſtroyed his ſubjects; the unfortunate remains of which, to the number of twenty thouſand families, made their retreat on the Wolga, and put themſelves under the protection of Ruſſia.

Several other branches of the Calmucks ſtill inhabit this part of Aſia. They have preſerved the courage and bravery they had in the time of Gengis-kan, and his ſucceſſors. It was with theſe ſame people, that theſe princes made ſo many conqueſts, and gave laws to all Aſia. The Mongals ſituated between China and Siberia are deſcendents from theſe ſame Tartars, and are equally brave. Moſt of them are dependents of the Chineſe empire, and are well trained to war. The Chineſe are at war with theſe warlike people; and indeed their laſt Kam having retreated into Siberia, where he died, the emperor of China demanded him with ſo much warmth, that the Ruſſians, after making many difficulties, were obliged to have the dead prince conveyed upon the frontiers of China: the Chineſe took this method to be aſſured of the death of this Kam, whom they ſtill feared.

The Ruſſians inhabiting towards the ſouth of Siberia, though ſubdued, are however moſt diſpoſed to revolt. I have been able to aſcertain this from my own obſervation, having purſued this route on my return from Tobolſky to St. Peterſburg.

It is evident from this account of the interior parts of Ruſſia, that the ſovereign is always obliged to maintain a large body of troops to keep the ſubjects in awe, and to defend the country

country from the inroads of the Tartars: it is this body which is called the army of government, and which amounts to about one hundred thouſand men: theſe troops are put to no other uſe; they never are engaged in war any where elſe, not only becauſe it would be too dangerous to leave theſe provinces and the confines without defence, but alſo becauſe theſe troops being ſcattered abroad throughout this empire, of near two thouſand leagues in length, and about five hundred in breadth, it is not poſſible to put them all in motion, and collect them. On ſome occaſions, they would come to the appointed place when the war was finiſhed, for the roads are impaſſable in ſummer-time; bridges are not always to be met with, even on the road from St. Peterſburg to Tobolſky, which is much frequented; ſo that, indeed, there is no travelling except in winter, in a ſledge, and although my attendants were no more than three when I travelled through this country, yet I could not always find in the villages a ſufficient number of horſes to go on with. It is on account of theſe local difficulties, and the extent of this empire, that the Ruſſians are not able to make any other uſe of the troops of government. They are neither trained up to war nor diſciplined, and are therefore not held in much eſtimation by the people of the country. They are very ill ſubſiſted, their pay not being more than about half of what the field troops receive. The ſoldiers have not quite one half-penny Engliſh *per* day; but they receive every month, as well as the field troops, two buſhels of flower, and one buſhel of oatmeal *per* man. This body of troops, conſiſting of near one hundred thouſand men, does not ſtand the kingdom of Ruſſia in more than one million one hundred and ſixty thouſand roubles; becauſe the people are obliged to furthem with proviſions for ſubſiſtence in kind. This tax, excluſive of the poll-tax and other cuſtoms, enables Ruſſia to keep up

a large body of troops, as the people furniſh the ſame proviſions to the field troops, from the commiſſary's clerk, to the Denſchik or officer's ſervant. The field troops are alſo ſtationed in garriſon in the moſt fertile provinces. By this management, the eſtabliſhment of the ſea and land forces, though conſiſting of three hundred and thirty thouſand men, does not coſt more than about ſix million four hundred thouſand roubles *.

According to the abſtracts I have ſeen, the expences of the court in money, do not exceed two millions of roubles, including the ſubſiſtence of the corps of cadets, the academies and miniſters in foreign courts; ſo that theſe ſeveral expences, and

* In order to determine the expence of the troops, I have extracted from the returns of the pay of the army, that of one regiment. It will be ſeen by the following detail, that the documents I have made uſe of, are ſufficiently preciſe to juſtify the inferences I have drawn from them.

Account of the annual charges of a complete regiment of thirty battalions, conſiſting of twelve companies of fuſiliers, and two of grenadiers. The allowances for forage, which are always paid in money, are included in this account.

Ranks.	Numbers.	Appointments of each officer and ſoldier including the ſtoppages for medicines.		Annual expence.		Rations of forage *per* month.	Rations of forage for ſix months in the year.	In money at 90 copecs *per* ration.		Number of officers ſervants.	Appointments and forage in money for the whole year.	
		Roub.	Cop.	Roub.	Cop.			Roub.	Cop.		Roub.	Cop.
Principal ſtaff												
Colonel	1	585	0	585	0	17	102	91	80	6	676	80
Lieutenant colonel	1	351	0	351	0	11	66	59	40	4	410	40
Major	1	286	20	286	20	11	66	59	40	4	345	40
Second majors	2	175	50	351	0	16	96	86	40	4	437	40
Each of theſe officers has a company.												

Ranks,

and thoſe of the army do not amount to more than about 8,400,000 roubles; and as I have computed the revenue of Ruſſia,

Ranks.	Numbers.	Appointments of each officer and ſoldier, including the ſtoppages for medicines.	Annual expence.	Rations of forage *per* month.	Rations of forage for ſix months in the year.	In money at 90 copecs *per* ration.	Number of officers ſervants.	Appointments and forage in money for the whole year.
Leſſer ſtaff		R. C.	R. C.			R. C.		R. C.
Quarter-maſter	1	117 0	117 0	4	24	21 60	1	138 60
Adjutants	2	117 0	234 0	4	48	43 20	2	277 20
Baggage-maſter	1	58 50	58 50	2	12	10 80	1	69 30
Pay-maſter	1	81 90	81 90	3	18	16 20	1	98 10
Commiſſary	1	81 90	81 90	4	24	21 60	1	103 50
Chaplain	1	64 35	64 35	3	18	16 20	0	80 55
Surgeon	1	175 50	175 50	3	18	16 20	0	191 70
Chief clerk	1	49 0	49 0	2	12	10 80	0	59 80
Surgeon's mates	2	117 0	234 0	0	0	0 0	0	234 0
Drum-major	1	6 57	6 57	0	0	0 0	0	6 57
Provoſt	1	7 57	7 57	0	0	0 0	0	7 57
Commiſſary's clerk	1	24 49	24 49	1	6	5 40	0	29 89
Clerk of the proviſions	1	24 49	24 49	1	6	5 40	0	29 89
Chapel-maſter	1	42 1	42 1	0	6	0 0	0	42 1
Muſicians and ſingers	6	6 57	39 42	0	0	0 0	0	39 42
Under provoſt	2	6 57	13 14	0	0	0 0	0	13 14
Captains	12	175 50	2106 0	5	360	324 0	0	2430 0
Lieutenants	16	117 0	1872 0	4	384	345 60	16	2217 60
Sub-lieutenants	30	81 90	2457 0	3	540	486 0	30	2943 0
Enſigns	12	81 90	982 80	3	216	194 40	12	1177 20
Serjeants	32	9 81	313 92	0	0	0 0	0	313 92
Maſters at arms	16	9 48	151 68	0	0	0 0	0	151 68
Standard bearers	6	9 10	54 63	0	0	0 0	0	54 63
Camp-color men	14	9 10	127 47	0	0	0 0	0	127 47
Corporals	64	7 57	484 80	0	0	0 0	0	484 80
Clerk of each company	14	7 57	106 5	0	0	0 0	0	106 5
Barbers	14	6 57	91 98	0	0	0 0	0	91 98
Drums	40	4 7	162 80	0	0	0 0	0	162 80
Fifes	4	6 57	26 28	0	0	0 0	0	26 28
Grenadiers and fuſiliers	2128	6 57	13980 96	0	0	0 0	0	13980 96
Foreign ſmith	1	59 10	59 10	0	0	0 0	0	59 10
Smiths	2	6 57	13 14	0	0	0 0	0	13 14
Foreign farrier	1	59 10	59 10	0	0	0 0	0	59 10
Farriers	5	6 57	32 85	0	0	0 0	0	32 85
Carpenters	14	6 57	91 98	0	0	0 0	0	91 98
Bat-men	71	7 2	498 42	0	0	0 0	0	498 42
Officers ſervants or Denſchik	106	6 30	667 80	0	0	0 0	0	667 80
Servants of artillery	6	7 2	42 12	0	0	0 0	0	42 12
Total	2637	3069 18	27209 92	101	2016	1814 40	106	19024 32

In this account the ſtoppages for medicines and for hoſpitals is not included; the ſovereign is at no expence for medicines.

Ruſſia, at thirteen millions four hundred thouſand roubles, there remain about five millions of roubles, for the other expences,

From the above abſtract it appears, that the ſoldier has not more than about one pound, ſeven ſhillings, and four pence Engliſh *per annum*, or not quite one penny *per* day; but there are beſides two buſhels of flower, and one buſhel of oat-meal given to him every month, as well as to each non-commiſſioned officer, from the commiſſary's clerk to the Denſchik; but the ſovereign has nothing to do with this expence: theſe proviſions are furniſhed in kind by the ſubject, chiefly by ſuch as are exempt from the poll-tax; and it is for this reaſon, that the troops are diſtributed throughout the moſt fruitful provinces, and throughout thoſe which do not pay the poll-tax. The ſovereign pays moreover for the ſoldier's coat, and for all that is neceſſary to complete him from head to foot. This expence amounts to about 12 roubles. The ſum is drawn from the yearly ſtoppages on the ſoldier's pay, which ſhould amount to 10 roubles 98 copecs *per annum*, whereas he receives only ſix roubles 57 copecs; but the whole expence for each ſoldier amounts to 10 roubles 98 copecs, or four roubles 41 copecs more than I have reckoned in the foregoing abſtract; ſo that we muſt add about 10,293 roubles to the charges of a regiment, and then the whole expences of a regiment will amount to 39,317 roubles.

From this account it is very eaſy to form a pretty exact idea of the expences of the Ruſſian forces, by means of the abſtract I have given. I have calculated them in the following manner:

Forty-ſix regiments of infantry, making a body of 121,302 men, at 39,317 roubles *per* regiment, amount to 1,887,216 roubles.

The expence of a regiment of cavalry exceeds that of a regiment of infantry by 2630 roubles, or about one twelfth part. This proportion may be thought too little, but it muſt be conſidered, that forage is ſupplied by the ſubject, as well as proviſions in kind, and that the horſes being bought in the country, coſt but little. The expence therefore of a regiment of cavalry, amounts to 41,947 roubles; and the forty regiments making a body of 63,316 men, amount to 1,677,880 roubles.

The guard of the Empreſs conſiſts of a body of 16,380 men; almoſt as many as are in ſix regiments of infantry or cavalry. Every body knows that guards are more expenſive than other troops. I ſhall however reckon their pay the ſame as that of the cavalry, or at 41,947 roubles; and the guards of the Empreſs then making a body of troops equal to ſix regiments, muſt take up 251,682 roubles, *per annum*. The charge of theſe troops is here rated as low as poſſible, their ſubſiſtence is not only much higher, but alſo the pay of moſt of theſe regiments is double to that of the others. But as I intend to conſider, whether the Ruſſian empire is able to maintain ſuch a large body of troops as it keeps up, it is better to rate the expences ſomewhat below than above the mark. If we were to de-

viate

expences, which are conſiderable *. From theſe obſervations it ſhould not ſeem probable, that Ruſſia, with ſuch a mo-

viate ever ſo little from this principle, the military eſtabliſhment would exhauſt the greateſt part of the revenue of Ruſſia.

The body of fortification, miners, artillery, and bombardiers, conſiſts of 10,960 men, which is equal to four regiments of infantry; and ſuppoſing the expences of theſe troops the ſame as the guard of the Empreſs, they will amount to 167,788 roubles. In the abſtracts I have had, it was computed at 300,000 roubles. I ſhall reckon it the ſame; and from theſe ſeveral calculations, the following reſults are obtained.

Expence of the field troops.

	Men.	Roubles.
Houſhold of the Empreſs	16,380	251,682
Infantry	121,302	1,887,216
Cavalry	63,316	1,677,880
Fortification, artillery, &c.	10,960	300,000
Total	211,958	4,116,778

The pay of the troops of government is very different from that of the field troops. The coſt of one of theſe regiments is not greater than about one half of the expence of a field regiment of the ſame number of men. In the account I had, I found the expence of the army of government, or militia, compoſed of

Expences of all the ſea and land forces.

	Men.	Roubles.
	99,266	1,161,155
Field army	211,958	4,116,778
Total of the land army, and its coſt	311,224	5,277,933
The fleet, the canal of Cronſtat, the officers and the ſailors making a body of	20,239	1,200,000
Total of land and ſea forces, and their coſts in money	331,463	6,477,933

* It has not been in my power to give a particular detail of theſe other expences, not having ſeen any account of them; but an explanation of the purpoſes to which they are applied, will be ſufficient to give us an idea of them, and will throw an additional light upon every thing that has been ſaid.

1ſt, In the account of the expences of the troops I have omitted the appointments of the general officers. A field marſhal has 8140 roubles, and the other officers in proportion. Nor have I included the rewards beſtowed upon the military people, either in penſions, or by granting them a certain number of the peaſants

moderate revenue, can defray all other neceſſary expences, and at the ſame time keep up a body of troops of three hundred

ſants belonging to the crown, which is very often done; and it muſt be obſerved, that this laſt method of beſtowing rewards is the moſt coſtly to the ſtate; becauſe theſe peaſants are for ever loſt to the revenues of the crown, whereas penſions laſt only for life.

2dly, The arms and ammunition for all theſe troops: this muſt be a conſiderable article, though much leſs coſtly in this country than any where elſe; becauſe theſe people being ſlaves, all handicrafts are at a very low price.

3dly, The repairs of the public buildings, of the court, and many other extraordinary expences of the court and the ſovereign.

4thly, The miniſters living near the ſovereign, the high chancellor, the vice-chancellor, the high-ſteward of the imperial houſhold, the high-treaſurer, and the maſter of the horſe.

5thly, The council of war, compoſed of four field-marſhals, two generals of artillery, and twelve lieutenant generals; this council attends to the ſupplies of the army, and the promotion of officers, as far as the rank of lieutenant-colonel. Under this council is placed the board of ordnance, the commiſſariat, the military cheſt, the clothing board, the victualling office, the comptroller's office, and the war office eſtabliſhed at Moſco.

6thly, The admiralty, which has the cognizance of all affairs reſpecting the navy: it has the inſpection of all foreſts, and woods, ſituated on the large rivers. Under the admiralty there is firſt the commiſſary-general of the navy, whoſe buſineſs it is to pay every thing relating to this branch, as proviſions, and the ſubſiſtence. 2dly, The office eſtabliſhed for the care of the magazines, and all things neceſſary for the fitting out of ſhips. 3dly, The office for the building of ſhips, and all materials relating thereto. 4thly, The artillery and navy office.

7thly, The eſtabliſhment for foreign affairs, the buſineſs of which is to expedite all ſecret diſpatches, to pay the miniſters at foreign courts, and the penſions and gratuities given to theſe miniſters, to officers and other perſons. This eſtabliſhment regulates likewiſe all the extra-buſineſs of the ſtate. There is an office belonging to it at Moſco, which receives and diſtributes the monies allotted to theſe purpoſes.

8thly, Two colleges of juſtice; the one at St. Peterſburg, the other at Moſco. The adminiſtration of juſtice belongs to them. Peter I. ordered, that they ſhould take no fees, and aſſigned to the judges and clerks, ſalaries out of the public money*. On the contrary, there are no ſalaries given to the ſenate.

9thly, The treaſury appointed to receive the public revenues, except thoſe which ariſe from the poll-tax and the ſalterns. There is at preſent an office at St. Peterſburg for the adminiſtration of the revenues from the conquered provinces: all the other departments are at Moſco. I do not include in the treaſury the

* Voltaire, tom. ii. p. 228.

number

hundred and thirty thouſand men: although I am convinced that this is a true ſtate of the caſe, yet I will ſuppoſe the contrary, that this power is capable of maintaining ſuch a body of troops, and at the ſame time of anſwering all the expences which neceſſarily attend the adminiſtration of ſo extenſive an empire: it is however a certain and known fact, that Ruſſia is enabled to keep its government and field troops in time of peace merely becauſe there is little coin neceſſary to anſwer the expences, and that the people furniſh proviſion for their ſubſiſtence in kind, and forage for the cavalry; provided that the greateſt part of the troops is ſent

number of perſons employed in collecting the revenue, the tolls, the cuſtoms, the ſalterns, &c. All theſe perſons are of no expence to the ſtate, becauſe they are paid by thoſe farmers who are called *Otkoupckiki*.

10thly, The ſecretary of ſtate's office, which directs the diſtribution of public money, and iſſues out orders to the treaſury; the pay-offices eſtabliſhed at St. Peterſburg pay nothing without orders from thence.

11thly, The auditor's office appointed for receiving and examining the accounts of all the other offices.

12thly, The board of trade, which has the direction of the mines, the manufactures, the maritime cuſtoms, the tolls in the ports, and ſettles all the differences between the merchants.

13thly, The ſalt-office directs the revenue of the ſalterns, and receives the money which is paid into the imperial cheſt on that account; it appears that theſe two laſt offices (12 and 13) are not paid out of the royal treaſury.

14thly, The ſeveral chanceries diſtributed throughout this vaſt empire, and all the governors and other military perſons employed, who receive their appointments from the chanceries of their reſpective provinces, as well as a great number of other officers belonging to the court.

We may readily conceive, from this catalogue of the number of perſons neceſſary for the buſineſs of all theſe offices, that the revenue of Ruſſia would not be nearly ſufficient to ſupply all theſe expences, if it was entirely taken from the revenues of the ſtate. This point may eaſily be cleared up hereafter; I could have done it during my ſtay in Ruſſia, if I had then had the account in as good order as I have given it here; but it was neceſſary firſt to collect all the materials, which took up a great deal of time. It is certain, however, that the expences of the army, as well as the appointments of ſome of the offices, are taken out of the royal treaſury. Five millions of roubles therefore, are a very moderate revenue to ſupply the expences of the military alone; although in thoſe branches relative to the making of the arms, the ammunition and the navy, there are many reſources ariſing from the ſtate of ſlavery Ruſſia is in, which enable her to employ a number of hands, for theſe ſeveral purpoſes, at a very low price.

into

into the moſt fertile provinces; but all theſe advantages are loſt in time of war, becauſe it is impoſſible to export the proviſions and forage beyond the limits of this extenſive empire; and Ruſſia being unable on account of its moderate revenue, to bear any extraordinary expences, it is moſt evident, that this power can not maintain upon its revenue, an army out of its own dominions. This is a truth known to all perſons who are the leaſt acquainted with the ſtate of Ruſſia; it was neceſſary, however, to examine the principles on which it is founded.

Suppoſing the ſea and land forces of Ruſſia to amount to three hundred and thirty thouſand men, the field troops make up about two hundred and ten thouſand, ſixteen thouſand of which compoſe the guard of the ſovereign, and the reſt of the army conſiſts of one hundred and ninety-four thouſand men. Many of theſe troops are employed to guard the criminals, and to conduct them to the mines. The detachments from regiments in Ruſſia are conſiderable as well as the non-effectives. In the returns I have ſeen, the non-effectives amount to 700 in each regiment, conſiſting of 2637 men: this great deficiency in the Ruſſian regiments is owing to the following cauſes. Part of the non-effective account belongs to the war-office. The provinces from whence the recruits are raiſed, are very far diſtant, and they are not eaſily brought together, becauſe the roads are almoſt impaſſable: the Ruſſians have the greateſt averſion to the ſervice, for which reaſon many of them deſert, and many die of fatigue before they join the regiment; from which, theſe recruits are often ſeven or eight hundred leagues diſtant, and ſometimes more. In the inner parts of the kingdom, I have ſeen how much the Ruſſians diſlike the army. I followed one of theſe parties for ſome time on my return from Tobolſky to St. Peterſburg; after having quitted it on going into any town, where I ſtopped

for

for ſeven or eight days, I often rejoined it the day after my ſetting out from thence, and I learned from the Ruſſian officer who commanded the party, that the deſertion was ſo conſiderable, that he did not expect to conduct one half of them to St. Peterſburg, although he took up ſome regular troops on his way to prevent deſertion. The countenance of each ſoldier was clouded with deſpair; and the recruits appeared like a ſet of wretches condemned to the gallies. Deſertion is doubly injurious to Ruſſia: for the loſs of troops is not the only conſequence of it; the deſerters not being able to appear, leſt they ſhould be taken up, collect themſelves into bands of robbers who infeſt the country: it is not from hearſay alone that I aſſert this fact, as I was obliged to take an eſcort with me at my return from Tobolſky, in order to travel acroſs theſe provinces with any degree of ſafety.

Suppoſing the non-effectives at ſeven hundred *per* regiment, they will turn out to be ſeventy-five thouſand at leaſt in the field troops, which I have reckoned at two hundred and ten thouſand men; from which the guard of the Empreſs conſiſting of ſixteen thouſand men, who are always near her, are to be deducted. The field troops are then reduced to about one hundred and twenty thouſand men; from which we muſt ſtill deduct a number of perſons, included in the military ſtate of each regiment in Ruſſia, though they are never in action. Among theſe are the quarter-maſters, the clerks, the barbers, the ſmiths, the farriers, the carpenters, the bat-men, both of officers and artillery, and ſeveral other people in office. Theſe perſons amount to more than three hundred *per* regiment, and more than thirty thouſand among the field troops. If we afterwards conſider the great number of ſoldiers detached from the regiments, it is eaſy to conclude, that although the ſtanding forces of Ruſſia amount to three hundred and thirty thouſand men, including army and navy, yet this power cannot

bring into the field more than about ſeventy or fourſcore thouſand regular troops at once; and I have been acquainted with ſeveral officers, who were perſuaded that there could never be more than ſixty thouſand effective fighting men in the Ruſſian army. In the laſt war, the forces of Ruſſia, both by ſea and land, appeared to the higheſt advantage: all the troops that could be gathered together were brought from the inner parts of the empire, in order to ſend a large army into Germany. But upon examining the ſeveral campaigns of the Ruſſians from the year 1757 to 1761, we find that their armies in general conſiſted of no more than one hundred thouſand men, including the irregulars before mentioned, the workmen, the ſervants, and all other perſons employed, who are reckoned in by the Ruſſians among the troops. Theſe laſt amounted to upwards of fifteen thouſand men; and the number of irregulars was ſtill greater; ſo that the regular troops could not amount to more than about ſixty thouſand men, and were often fewer. The army appears more conſiderable from my calculations, becauſe I have ſuppoſed it to conſiſt of three hundred and thirty thouſand men; whereas, according to the ſtate of it publiſhed by the Ruſſians on the 16th of March 1760, a time when they ought neceſſarily to have had the greateſt number of troops on foot, it amounted to no more than two hundred and eighty-four thouſand men; and it is even probable, that the irregulars were included in that account.

A Ruſſian army, however complete it may be at the beginning of a campaign, loſes a number of men by ſickneſs. This circumſtance may appear extraordinary, becauſe the Ruſſian ſoldiers are generally ſtronger and more healthy than thoſe of other nations: as they even lie upon ſtraw or upon boards, without ſuffering any inconvenience. Beſides, they do not deſert when they are in the field, either from the difficulty of getting away, or from religious motives, or from their ſtupi-

dity,

dity, which may perhaps induce them even to be fond of ſlavery, or from their not knowing where to go, as they are unacquainted with any language but their own, or from their imagining that happineſs is no where to be found but in the midſt of the ſnows of Ruſſia. It is true indeed, that in 1761, one hundred ſoldiers deſerted from the ſingle regiment of Azo in the courſe of a few days; but ſuch incidents are ſo rare, that we may fairly conclude, there is no deſertion among Ruſſian troops when they have once joined the army. But the number of Ruſſians killed in the laſt war, added to thoſe who died of ſickneſs, was ſo conſiderable, that I have known ſeveral of their officers, who were perſuaded, that the Ruſſian army was almoſt renewed every year. The mortality, prevailing in conſequence of diſeaſes to which the ſoldiers are expoſed, ſeems to be owing chiefly to the following reaſons. In treating of the manners and the climate it has been obſerved, that the conſtitution of the Ruſſians requires that they ſhould uſe vapour baths twice a week. The general officers, and ſome others in the army, are able to procure themſelves the advantage of theſe baths; but it is impoſſible an army ſhould have the ſame: neither would it be proper they ſhould, if it could even be contrived, for the whole army would then be diſabled from fighting two days in the week. The ſoldiers therefore not being able, while on ſervice, to uſe theſe baths ſo neceſſary for their health, it is evident, they muſt be afflicted with many diſeaſes, and a great number of them muſt periſh; becauſe their hoſpitals are ſo ill attended, that they hardly deſerve that appellation. As there is a deficiency of phyſicians and ſurgeons at St. Peterſburg and at Moſco, this deficiency muſt ſtill be greater in the army.

The officers in general are little acquainted with the art of war: this ſcience, as extenſive as it is complicated, requires a variety of other knowledge on which it depends. There are

ſcarce any perſons in Ruſſia able to inſtruct others in theſe preliminary ſciences.

The Ruſſians have ſcarce any idea of Tacticks; they know not even the name of Xenophon, Herodotus, Polybius, *&c.* and are leſs acquainted with the great generals of the preſent age, from the nature of their atchievements, than from the report of their victories. It is, however, this art of ranging an army in the field, and teaching it a proper exerciſe, which often determines the fate of battles and of empires. All the Tactick of the Ruſſians conſiſts in forming their army in a creſcent, in ſquare, *en potence*, and ſometimes in form of a triangle, and they ſeldom take the advantages of ground, becauſe for the moſt part they are unacquainted with them. Although moſt of their field troops are perfectly well diſciplined, they know not how to put their army in a proper order of march. They place the baggage, which is in great quantity, between the firſt and ſecond line, ſometimes promiſcuouſly. Part of the army is employed in conducting the carriages, to which moſt of the ſoldiers faſten their arms; and the march of a Ruſſian army is ſo diſorderly, that it rather reſembles the emigration of a people from one nation to another. The Ruſſians are little acquainted with the cuſtom of ſending detachments forwards, or with the uſe of ſpies; their irregulars, which are deſigned to protect them during a march, to clear the ſuſpicious places and to ſerve as ſcouts, are leſs attentive to theſe ſeveral circumſtances, than to ravage and plunder the places through which they paſs*; and indeed Marſhal Appraxin was ſurprized on his march in 1767. General Fermer encamped near Kuſtrim in 1756, had not a ſufficient notice of the king of Pruſſia's arrival, to prevent him croſſing the Oder. Soltikoff marching into Sileſia in 1759 was

* I have been aſſured, however, that towards the end ofthe laſt war, General Totleben, a foreigner in Ruſſia, had diſciplined ſome of the irregulars.

alſo

alſo ſurprized, and the moſt advanced regiments of his army were attacked on the place marked out for their encampment; the general being at that time a hunting. It is perhaps for this reaſon, that the Ruſſians, though near Sileſia, fell back every year into winter-quarters upon the Viſtula; at the diſtance of more than eighty leagues from the king of Pruſſia's army.

The officers have not the leaſt knowledge either of the forming of magazines, or of the diſtribution of proviſions. Flower and oatmeal is given to the ſoldiers, and one carriage for twelve men; and it is left to them to ſettle their ovens and make their own bread. It often happens that, through fatigue or neglect, the ſoldiers are very ill fed. To theſe ſeveral circumſtances is owing the ſlowneſs of the military operations of their armies; which are formed into enormous bodies not eaſily put in motion.

Theſe facts have been confirmed to me by all the officers I have ſpoke with, and by all foreigners who have been in the Ruſſian army. They are ſo many inconteſtible proofs that the body of officers are little acquainted with the art of war.

The Ruſſian ſoldier, being forced into the ſervice, is not actuated by any principle of honor or courage; but brandy, the dread of puniſhment, and the love of life, ſometimes inſpire him with a kind of bravery.

The artillery of the Ruſſians is very well ſerved, and is always very numerous. The cavalry is chiefly compoſed of dragoons and huſſars, as they have but ſix regiments of cuiraſſiers. This cavalry is too light to ſuſtain the charge of common horſe; which by its weight alone will always be ſufficient to bear down the Ruſſian cavalry. Their horſes, which are taken from their own country, are ſtrong and hardy; they are extremely fleet, but ſo ſmall that they ſink under the weight of their riders. After a few months campaign, a great part of

the cavalry is diſmounted. I have been aſſured however, that the Ruſſians ſometimes got their horſes from Holſtein; and indeed they might eaſily procure them from thence, as well as the other powers of Europe; but the ſcantineſs of the revenue will not admit of this additional expence. Every body allows that the Ruſſian cavalry is the worſt in Europe; but the ſame cannot be ſaid of the infantry. One hundred years ago, it was ſaid that the infantry fought well, provided they had ditches or palliſades before them, that they might wait for the enemy under cover; but that they fled in a very cowardly way if they ſaw no place of defence. It is remarkable, that all theſe facts are to this day ſtrictly true, although theſe troops are better diſciplined. If the Ruſſians ſee an eaſy retreat open to them, they think of nothing but running away; but if they are ſhut up, and obliged to defend their lives, they become formidable troops. A Ruſſian never fights for honor, but for life.

Theſe ſeveral opinions ſeem to be confirmed by the campaigns of the laſt war. The king of Pruſſia engaged near Sileſia, againſt the powerful armies of Germany, at the diſtance of more than one hundred leagues from the eaſtern borders of his own dominions, was never near enough to carry on a regular campaign againſt the Ruſſians. This monarch being able to act againſt them only with ſmall bodies of troops in that part of his kingdom, uſed to ſuffer them to advance till they became troubleſome to him, he then marched towards them with an intent to deſtroy them, giving orders that none of them ſhould be made priſoners; but this great king and his generals have almoſt always fought the Ruſſians where they had no open retreat; they were either thrown back upon their baggage in marches, or driven againſt a river. Theſe are exactly the poſitions in which the Ruſſians, who fight only for life, become formidable; they will not go forward one ſtep

to

to attack the enemy; but if they cannot eſcape, they muſt be killed before the field of battle can be gained.

If we conſider attentively the Ruſſian campaigns which have made ſo much noiſe during the laſt war, we ſhall be aſtoniſhed to find, that theſe people have never conquered any provinces, except ſuch as the king of Pruſſia had evacuated, on account of their being too far diſtant from the body of his army; and that he could ſpare but few troops to act againſt them in thoſe parts of his dominions.

The city of Kuſtrim being an advantageous poſt, the king of Pruſſia with a ſmall body of troops, attacked general Fermer, who was beſieging it: the Ruſſians claimed the honor of the victory; the king of Pruſſia indeed retired with conſiderable loſs; but general Fermer, having been joined next day by Romanzow's corps, raiſed the ſiege of Kuſtrim, and retreated into Pruſſia.

Soltikoff, after having gained two victories, one over general Wedél, who had no more than a ſmall corps to oppoſe to the whole Ruſſian army; the other, over the king of Pruſſia, who attacked the Ruſſian army combined with Laudon's forces near Francfort, did not obtain any other kind of advantage. This Ruſſian general fell back alſo into Pruſſia without attempting to lay ſiege to any place, or to follow the king. Butturlin, who ſucceeded him, would never attack this monarch; although he was joined by Laudon, one of the beſt generals belonging the Empreſs Queen; he rather choſe to keep always at a diſtance, fearing to be attacked himſelf; he alſo retreated and took refuge in the dutchy of Pruſſia: At length Romanzow took Colberg in December 1761, after a ſiege of about four months.

All theſe facts imply, that the Ruſſians have ſcarce made themſelves maſters of any other provinces except thoſe evacuated by the Pruſſians in the beginning of the war; and that

not only the officers have but little knowledge, but alſo that the troops are not very fit to form an attack, though, as I before obſerved, they make a reſolute ſtand in their own defence when they have no retreat open.

Every body knows that the military eſtabliſhment contributes much to the depopulation of a ſtate, and that in all governments the number of military perſons ſhould be proportioned to the number of inhabitants; without which balance a nation would deſtroy itſelf. If the army in France amounts to three hundred thouſand effective men in time of war, this number is conſiderably reduced in peace; beſides that there are more than twenty-ſeven thouſand foreigners in pay among theſe troops. Notwithſtanding this prudent regulation, it is certain, that population does not increaſe in France, if even it does not diminiſh.

Ruſſia, though leſs populous than France, is obliged on account of the extent of its dominions, to keep up in time of peace an army of near three hundred thouſand, or at leaſt two hundred and fifty thouſand men, if the troops which are to take the field amount to about fifty thouſand. Such a conſiderable body of troops muſt be very injurious to the peopling of this ſtate, in which other cauſes of depopulation ſeem to foretel the total deſtruction of the nation.

From all that has been ſaid, the following ſummary may be collected.

The military eſtabliſhment of Ruſſia, including the naval forces, the army of government, and the field troops, amounts to three hundred and thirty thouſand men.

Although the revenue of Ruſſia does not exceed ſixty-five or ſeventy million of French livres, yet the empire is able to maintain this conſiderable body of troops; becauſe the pay of the ſoldiers in money is very trifling, and that the troops are garriſoned

garriſoned in the moſt fertile provinces, which ſupply the proviſions neceſſary for their ſubſiſtence in kind.

Ruſſia, with ſo numerous an army, cannot bring into the the field more than ſixty or ſeventy thouſand effective regulars, and even by this the dominions are depopulated. This power not being able to bear any extraordinary expence, on account of its moderate revenues, is not able of itſelf to maintain ſuch an army out of the empire, becauſe the proviſions which the people in the ſeveral provinces furniſh, cannot then be conveyed to them.

The navy of Ruſſia is weak, not only becauſe there are but few ſhips, but alſo becauſe the ſea officers have as little knowledge as thoſe of the land; beſides, the Ruſſians have no ſailors, and never will have any while they do not carry on trade themſelves.

The Ruſſian artillery is very well ſerved.

Their cavalry is the worſt in Europe.

The infantry are the beſt troops they have; moſt of them are well diſciplined: they are not fit for an attack, but defend themſelves pretty well, even when not covered; when they are, they are very formidable, eſpecially when there is no retreat open for them.

The corps of engineers have but little knowledge, and are incapable of conducting a ſiege. The Ruſſians only know how to bombard a city.

I have thought the knowledge of theſe facts might be uſeful in Europe, becauſe they remove the prejudices which have been entertained in regard to Ruſſia; and this, if there is no other advantage attending it, is correcting a prevailing error. The inhabitants of Lubeck and Hamburg trembled at the name of the Ruſſians. Poland and Germany, through which I have paſſed, conſidered Ruſſia as one of the moſt formidable powers of Europe. The Ruſſians entertained the ſame

idea of their own empire, eſpecially Peter III. and at the time I am now writing, France and a great part of Paris conſider it in the ſame light. While I was at St. Peterſburg, juſt ſetting out for Siberia, I received a letter from Paris, deſiring me to take an accurate ſurvey of this country, from whence whole nations were in a ſhort time expected to emigrate, and, like the Scythians and the Huns, to over run our little Europe. Inſtead of ſuch people, I found marſhes and deſerts.

In order to determine the power of Ruſſia, the calculation muſt not be made in proportion to the extent of its dominions, as moſt writers have done; but rather in an inverſe ratio of this ſame extent: in this view it will appear weak. In the preſent ſtate of population and wealth in Ruſſia, an army cannot be ſent beyond the confines of the empire, without being ruined even by the victories it may gain; a Ruſſian army in ſuch a ſituation muſt be almoſt entirely deſtroyed, though the auxiliary ſubſidies ſupply the troops with ſubſiſtence: the officer's pay being very trifling, he is obliged to ſpend part of his own fortune out of the empire, and it is generally known, that Ruſſia is always extremely attentive to prevent the exportation of coin, becauſe it has already felt the ill effects of this practice: indeed, all the Ruſſians allow that the laſt war has been extremely fatal to the ſtate.

The ſovereign of Ruſſia would find the advantage of giving up the project of extending the empire; he ſhould rather endeavor to collect and bring all his ſubjects together. This advantage would be conſiderable if all the northern part of Siberia was left to the bears, and the inhabitants were tranſported from this frozen region into the deſerts of the ſouthern parts of this province; which, from the temperature of the climate, and the fertility of the ſoil, are very proper to become the habitations of men. The only inconvenience attending this, would be, that the Tartars, being their neighbours, might learn the art

of war from the Ruſſians, as theſe have acquired it from the Swedes. However this may be, Ruſſia, by bringing thoſe people together, would no longer be obliged to maintain in time of peace, a large body of troops, which increaſes the depopulation, and adds to the expences, without advancing the power of the ſtate. By this alteration, its power would become much more conſiderable, becauſe all its troops might then be employed in the defence of the empire; and if Ruſſia ſhould endeavor, as things are at preſent, to ſet theſe people free, there will be the greateſt difficulty in making this liberty compatible with its own ambitious views. The ſovereign, while he remains abſolute maſter of the lives and fortunes of his ſubjects, may maintain a conſiderable army, by allowing a moderate ſubſiſtence to the ſoldiers, and to all perſons employed in the ſervice of the army; but he will loſe this advantage, whenever theſe people become free.

From theſe ſeveral obſervations, it has appeared to me, that many perſons have entertained too high an idea of Ruſſia, while others have been led into a contrary extreme. This power will always be formidable to the northern ſtates in its neighbourhood.

FINIS.

ERRATA.

Page 11. Line 20. *for*, ſervility; *read*, ſervitude.
16. Laſt line but one, *for* painting, *read* ſculpture.
17. —— 6. *for*, well filled with trees; *read*, well planted; and inſert the following words; kept in good order, and well ſtocked with deer, *&c.*
18. Laſt line but one, *for*, ſix; *read*, two.
19. Laſt line, *for*, cachra; *read*, cacha.
23. —— 30. *dele*, but as.
23. —— 31. *for*, we were determined; *read*, yet we were determined.
28. —— 22. *for*, Tſchoudowai; *read*, Tſchoudoiwa.
34. —— 20. *for*, more than one hundred feet; *read*, about fifty toiſes.
34. —— 22. *for*, thirteen or fourteen feet; *read*, ſix or ſeven toiſes.
36. —— 12. *for*, three hundred and eighteen feet; *read*, one hundred and fifty toiſes.
36. —— 13. and 14. *for*, one hundred and thirty ſeven feet; *read*, ſixty toiſes.
36. —— 18. and 19. *for*, eight hundred and fifty feet; *read*, about four hundred toiſes.
40. —— 11. *for*, are; *read*, were.
42. —— 7. *for*, one foot high, and ſix inches wide; *read*, one foot wide, and ſix inches high.
60. Laſt line but one, *for*, fourſcore thouſand; *read*, fourſcore and three thouſand.
61. —— 25. *for*, than fifty; *read*, than from fifty.
63. —— 12. *for*, Paiadinſka; *read*, Paiudinſka.
77. —— 17. *for*, three hundred thouſand and eighteen werſts; *read*, three thouſand one hundred and eighteen werſts.
78. —— 20. *for*, eclipſe; *read*, planet.
78. —— 29. *for*, conſtrued, *read*, conſtructed.
109. —— 26. *for*, theſe; *read*, thoſe.
112. —— 30. *for*, here are extenſive; *read*, here extenſive.
116. —— 16. *for*, would; *read*, will.
117. —— 19. *for*, Schuwachi; *read*, Schuwaſchi.
120. —— 40. Of the figures; column 3. *for*, 20 d. 9 m. 9 s. *read*, 20 d. 9 m. 0 s.
121. —— 4. Below the table, *for*, 1,570,060 toiſes; *read*, 57,060 toiſes.
127. —— 7. Above the table; *for*, 552 toiſes, 7 inches, *&c.* *read*, 552 toiſes 3 feet 7 inches, *&c.*
168. —— 6. *for*, as that; *read*, as in that, *&c.*
177. —— 17. *for*, but, it ſtill; *read*, but it is ſtill.
182. —— 2. *for*, 41 $\frac{2}{1}$, *read*, 41 $\frac{3}{4}$.
190. —— 21. *for*, amber; *read*, umber.
195. —— 25. *for*, conſiſts; *read*, conſiſt.
199. —— 18. *for*, cryſtallizations of a cryſtal matter; *read*, cryſtallizations of the nature of quartz.
207. —— 11. *for*, was; *read*, is.
212. —— 17. *for*, foſſils; *read*, foſſil.
220. —— 5. of the note, *for*, ſlope; *read*, ſlope.
231. —— 1. *for*, you; *read*, one.
247. —— 1. of the notes, *for*, tom. ii; *read*, tom. i.
249. —— 13. *for*, the 11th; *read*, the 14th.
277. —— 7. *for*, falſe; *read*, falſe.
308. —— 26. *for*, opportunity; *read*, opportunities.
315. —— 16. *for*, ſtores; *read*, ſtoves.
320. —— 26. *for*, Epiney; *read*, Epinus.
331. —— 14. *for*, every elſe; *read*, every where elſe.
343. —— 28. *for*, pence; *read*, halfpence.
358. —— 10. *for*, Mota; *read*, Miſta.
361. —— 18. of the note, *for*, the revenue of the port; *read*, the revenue of the poſt.
364. —— 7. of the notes, *for*, deſerve the attention; *read*, deſerve attention.
382. Laſt line of the notes, *for*, p. 228; *read*, p. 223.

