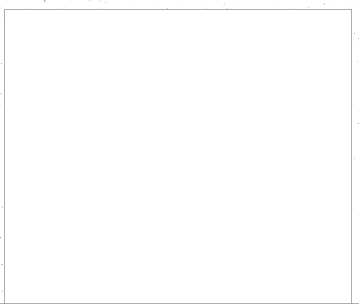


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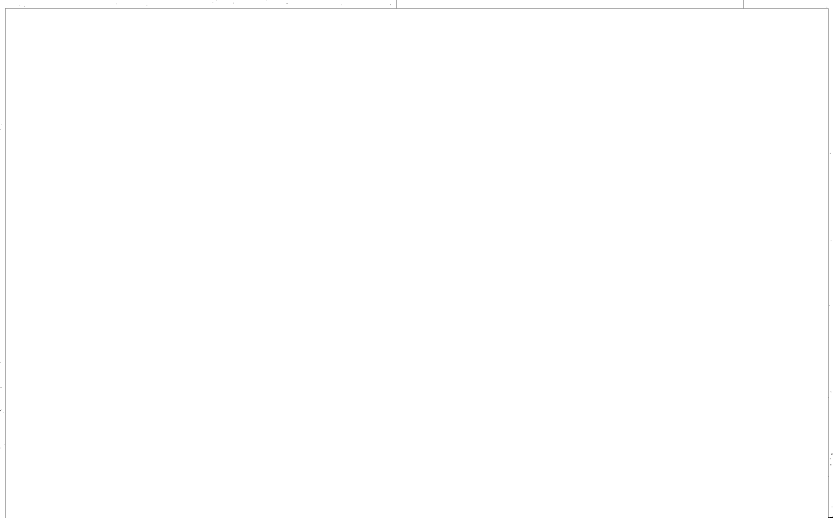
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FUNDAMENTALS
OF MILITARY GEOGRAPHY

FEDERATIVE PEOPLE'S REPUBLIC OF JUGOSLAVIA

by

Major General Ivan A. BOZITCH
Colonel Milan A. KNEZEVICH

Belgrade, 1954

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Military Publishing House "Vojno Delo"

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PREFACE

The second volume of military geography "Federative People's Republic of Yugoslavia" was written with the aim of giving the reader the essentials of military geography of his own country. The book presents general and most important, i.e. most characteristic information about the importance of the Army, physical features of individual regions, mountains, rivers, towns, etc. and their influence on military operations in wartime. Many an interesting detail, that could not be included in this book, should be carefully studied, for they, in addition to these presented here, are the basis for a deep study of military geography.

Accordingly, this book, together with the first volume --- "On Military Geography in General" --- ought to be a fundamental for the reader in his further study of military geography of our fatherland.

It is necessary to point out that today, when our socialistic building-up is in full swing, almost all statistical data gets out of date very soon. In the course of working at this book we twice collected latest information and data, but this does not mean that they will be valid

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when the reader gets the book, for with this speed of development, a plan of yesterday is reality today, and a fact today is changed tomorrow. Therefore, one ought to read newspapers and other publications continually in order to keep pace with the development of economy as a very important military-geographical element of our country and its defensive potential.

All the titles and names in this book have been taken from the newest map of Yugoslavia, scale 1:500,000, published by the Geographical Institute of the Yugoslav People's Army in 1950, it being most competent in this respect.

Our very useful assistants were: Colonel Serutcher ZRDAVKO and Lt-Col Lazarevich ANTONIJE.

We are grateful to the Yugoslav Air Force Headquarters for photographs of individual areas and geographical objects.

May, 1954

Authors

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GEOGRAPHICAL-POLITICAL POSITION

AND ITS CHARACTERISTICS

Federative People's Republic of Yugoslavia is located in the south of Europe from 40° 51' to 46° 53' northern latitude. Within the same parallel are Bulgaria and South Rumania in the east, and Middle and Northern Italy, Southern France and Northern Spain in the west. The meridian distance between the southernmost point (three borders junction - FFY, Greece and Albania - on Lake Prespa) and the northernmost (village Budimoi, 11 km east of the point where the borders of FFY, Austria and Hungary meet) is 667 km. In addition to other factors, this north-south extension causes a considerable variety of climate in our territory. Further on, Yugoslavia covers the territory between 13° 23' and 23° 02' longitude east of Greenwich, thus being included in the Middle European Time Zone. Parallel distance between the westernmost point (6 km west of village Zag, northwest of Kobarid) and the easternmost (Gangine Kale, elevation 1744 m, in Malesvevo Mountains towards Bulgaria) is 774 km.

According to the latitude, Yugoslavia is in the middle of the Northern Temperate Zone.

About three-quarters of Yugoslavia belongs to the Balkan Peninsula. It covers the middle part which is crossed by the Morava and Vardar Valleys, and the whole north-western part between the Sava and the Adriatic Sea. In the north, with the rest of its territory, it penetrates into Middle Europe from which it is separated by the line: the Danube, the Sava, Ljubljana valley, the Idrija, the Soca. Although it is partly a Danubian and Adriatic country, Yugoslavia is primarily a Balkan state.

Land, river and lake frontiers are 3,026.2 km long, while the coast without islands (from the Bojana to village Lazaret) is 2,016 km (or along a straight line 645 km). The proportion between its land and sea frontiers is about 3:2. It is accordingly a continental-maritime (semi-central) country.

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The Balkan Peninsula is a natural bridge between Europe and Asia: intense traffic circulates across it. It is open towards the European main body; it is separated from Asia only by narrow straits (Bosporus from 0.3 to 6 km wide and Dardanelles 1.3 to 7 km wide); it is only about 400 km from Africa. Thanks to its vicinity to ancient civilizations and good communications with Asia, the Balkan Peninsula made its appearance on the stage of history before the Apennine and Pyrenean Peninsula. It is a cross-roads of international roads running from Northern and Western Europe to the Near and Middle East, and the theatre in which the conflicting interests of great powers collide. Even today, imperialistic states do not leave the Balkans, especially the Yugoslav peoples, to live in peace. Before the Turkish invasion, a densely populated peninsula (4,000,000 inhabitants), culturally and economically developed, it was, due to its position, exposed to various invasions, often plundered, ruined, and at a standstill for centuries, while other peoples, far away from the Balkan Peninsula, were in the position to make progress.

The Federative People's Republic of Yugoslavia is naturally connected with many wide geographic and economic regions: the Pannonia Plain in the north, the Alaska Plain and the Black Sea Basin in the east, the Mediterranean in the south, and the Lombardia-Venetian Basin in the west.

At the same time, Yugoslavia is a Danubian country, for the Danube flows across its territory, an international river (second in Europe in length) connecting eight European states, and through a net of canals, it is connected with the Rhine. From the point where the Danube enters Yugoslavia to Ram (mouth of the Nera River) both banks belong to it.

Along the valleys of the Sava, Drava and Mura, historical communications run toward the West and these valleys are natural gates in our northern frontiers through which Western Europe is connected with our communications. Along the valleys of the Sava and the Danube, that are naturally connected with the valleys of the Morava and the Vardar, run transcontinental communications of international importance connecting Middle and Western Europe with Zagreb, Belgrade and Salonika. The Morava-Vardar Valley is continued at Nis by another transcontinental magistral line: Nis - Istanbul, and further on, across Asia Minor to Baghdad and the Persian Gulf and other countries of the Near and Middle East (Syria, Palestine, Egypt, Jordan and Arabia). This magistral line runs along the valleys of the Nisava and the Maritsa. Invaders moved along these valleys either from Asia to Europe in order to occupy the Balkan Peninsula or from Europe to Asia. The Turks in the Middle Ages used the same route to penetrate into Europe, and also the Crusaders traversed the Balkan Peninsula along the same magistral line: in a new era it was the magistral line of German aspirations (Drang nach Osten). In World War I, the Germans, together with the Austro-Hungarian Empire and Bulgaria, attacked Serbia in October 1915 and took possession of these international routes which were very important from the strategical point of view, for Turkey, who was on their side, was supplied along them.

This geographic position of Yugoslavia is very favourable regarding economy and culture, for it brings her nearer to neighbouring economic and cultural areas, and far parts of the world, but at the same time, this position was the cause of fatal events in the history of our people.

For that reason the geographic position of FFYJ with regard to both strategy and politics is very delicate, requiring watchfulness and readiness for the defence of frontiers and peaceful development.

Yugoslav south-western border is the Adriatic over which Yugoslavia communicates with the Mediterranean and other parts of the world. FFYJ is

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at the same time Adriatic and Mediterranean country; it is one of East Mediterranean countries; so it has all the advantages resulting from its semi-central position. The Adriatic penetrates deeply into the body of Central Europe. Its northernmost bays - Trieste and Rijeka - are most suitable ports for the Danubian countries. When at the beginning of the eighteenth century Trieste became the main port of the Northern Adriatic, Austria built railroads in the territory of present Yugoslavia from 1846 to 1849 (Maribor - Celje - Ljubljana - Trst). The importance of Trieste has been growing since. Sea and land communications, starting from the Northern Adriatic, traverse Yugoslavia, making it important and its position delicate from the strategic point of view.

Vital strategic lines of operations run from the Northern Adriatic east, north and westward. They are: from Trieste or Rijeka - St. Peter - Krasu (Pivka) - Postojna - Ljubljana - Maribor - Vienna, or via Jesenice to Carinthia; Trieste - the Soca valley to Carinthia; or Trieste - Udine (Videm) - Kanalska valley - Carinthia; Rijeka - Zagreb - Budapest. From the military, political and economic point of view, Trieste will be very important in the future, too.

Jugoslavia has comparatively many neighbours - 8. In Europe only Germany is surrounded by more than that - 9. A great number of neighbours usually does not give any political and strategic advantages. England, thanks to her position in the Isles, has no land borders with other countries, so that she had many strategic and economic advantages for centuries - until the aircraft appeared - in comparison with continental countries. Situated in the Isles and protected by her powerful navy from any hostile invasion, she has been able to build up her empire in peace for the last 300 years. Her territory has not been invaded since 1066 (William the Conqueror).

Jugoslavia has common frontiers with: in the west: Italy, the Adriatic, Albania; in the south: Greece; in the east: Bulgaria and Rumania; in the north: Hungary and Austria.

SHAPE

On the map FPR of Yugoslavia looks like a triangle whose points are round a little and whose basis is mainly the Adriatic. From Triglav to Gevgelija it is long about 890 km; the height of the triangle from the point of view where the borders of Yugoslavia-Hungary and Rumania meet to Metkovic is 412 km. The geometric centre is between Sarajevo and Zvornik (east of Kladanj) and the central triangle within the area Sarajevo - Zvornik - Zavidovici.

The shape of Yugoslavia, accordingly, is a triangle extended from north-west to south-east. Albania penetrates in its territory in the form of a wedge from south to north in the southern part of the triangle.

Although being considerably extended, Yugoslavia has a sufficient depth in its central part (412 km), while some other countries in Europe are much narrower at the widest point, as for example, Hungary 270 km, Bulgaria 320 km, Austria 260 km, Czechoslovakia 280 km, Switzerland 205 km, etc.

It is difficult to defend small and extended countries from hostile invasion. The Germans cut up Czechoslovakia on March 15, 1939, in several hours. Austria is of similar unfavourable form.

Nevertheless, the shape of FFRY, taken as a whole, cannot be considered unfavourable, for the state frontier has no sharp angles that would cover large sections of the territory. From the operational and strategical

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point of view the north-west region is vulnerable due to recess of the Hungarian border along the sector extending from the three borders point (with Austria) to Donji Miholjac; especially because this area is surrounded from the three sides (borders with Austria and Italy). Besides, this projection of Hungarian border threatens our vital communications Ljubljana - Zagreb - Belgrade, for they run near the frontier (the distance from Donji Miholjac to Slavonki Brod is about 70 km) and south of the Sava there is no parallel communication that could play the role of the first if the latter is lost. (Such a railway line is under construction now: Belgrade - Ripenj - Valjevo - Zvornik - Tuzla where it would join the existing line Tuzla - Dobojski - Banja Luka - Bosanski Novi, and from Bosanski Novi it would run to Karlovac). The region south of the line: Pec - Pristina - Surdulica - Desoani Kladenac is more vulnerable, for the territory of Yugoslavia south of this line gets narrower, and it is traversed by the most important communication that runs along the Morava - Vardar valley to Salonika. The People's Republic of Macedonia is squeezed between Bulgaria and Albania. Between Leskovac and Vranje the Bulgarian border is only 30 km far from the Morava valley. In World War I, this south region was not defended sufficiently, so that the Bulgarians in the course of the second day of the war in 1915 cut off the Serbian line of retreat toward Greece, forcing the Serbian Army to withdraw towards Albania and Montenegro under most unfavourable conditions. Also in World War II attention was not paid to the shape of the south-eastern part of Yugoslavia and the protection of Macedonia and its connection with Greece, which allowed the cutting off of Macedonia by the German forces in the initial phase of their offensive in 1941.

The weakness of such a shape is not only in its extension, but also in the length of its periphery (land frontiers are long 3,026.2 km and the coast 2,016 km). The People's War of Liberation proves clearly that geographic form, although very important by itself, need not be the decisive factor in war.

SIZE

The Federative People's Republic of Yugoslavia covers the surface of 256,850 square km. It belongs to the group of countries of medium size (small: under 200,000 square km, and large over 1,000,000 square km). Jugoslavia is twice as large as Czechoslovakia, 2.75 larger than Hungary, three times larger than Austria; somewhat larger than Rumania. Bulgaria, Greece and Albania together would hardly cover its surface, and also Portugal, Switzerland, Belgium, Holland and Denmark altogether. FFRY is about 13,000 square km larger than Great Britain; its surface is 5/6 that of Italy, or 1/2 that of France.

The size of the individual people's republics are:

FR Serbia	88,766 square km,	34.56%
FR Croatia.....	56,284 " "	21.91%
FR Slovenia.....	20,251 " "	7.88%
FR Bosnia and Herzegovina....	51,348 " "	19.99%
FR Macedonia.....	26,234 " "	10.21%
FR Montenegro.....	13,967 " "	5.44%

TOTAL: 256,850 square km 99.99%

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BOUNDARIESFree Territory of Trieste

(No longer valid)

The Adriatic

The FFR of Yugoslavia is in possession of the Adriatic coast from village Lazaret to the mouth of the Bojana.

The straight air line of the Coast is about 645 km, and the length of the Coast with bays 2,016 km.

According to the Law of Territorial Waters, shore area is divided into two zones:

- a) Home waters, which include all bays and channels;
- b) Territorial waters, which embrace a zone of six nautical miles from the border of home waters, i.e. from the shore of islands. In addition to these six nautical miles, the same law provides that a further zone of 4 nautical miles belongs to FPRY; both marine fauna and flora belong to Yugoslavia within this zone.

Outside these zones the sea is international property.

According to the relief and other military and geographic elements, the Adriatic Coast may be divided into 5 sectors:

- a) ISTRIAN SECTOR - from village Lazaret to Volosko;
- b) CROATIAN LITTORAL SECTOR - from Volosko to the Zrmanja;
- c) NORTH DALMATIAN SECTOR - from the Zrmanja to Makaraks (inclusively);
- d) SOUTH DALMATIAN SECTOR - from Makarska to Cavtat (inclusively);
- e) THE SECTOR EXTENDING FROM CAVTAT TO THE MOUTH OF THE BOJANA (mainly Montenegrin sector).

ISTRIAN SECTOR. The western shore of Istria is low, almost the full length rocky and dissected. In front of the shore there is a great number of small, stony islands and rocks that might make the approach difficult, but their significance does not go beyond tactics; towards inland the shore is open and with good communications. A zone of about 18 km in width extending along the western coast (from the shore to the line Piran - Vizinada - Kanfanar - Maršana, does not exceed 200 km above sea level. Small groups of trunks and bushes are the remainder of sometime rich oak forests. West of the line Piran - Pazin - Labin is Red Istria known by its red earth and Mediterranean climate. Red soil is fertile. Western parts are cultivated (vine, olive, lemon, orange, etc). Localities along the coast are densely situated. Inland is short of water, for limestone is predominant. The eastern sector is low and dissected only in the south to Rasa Bay; farther on towards north, immediately along the shore, mountain ridges 400, 500 and rising; they are steep and rocky (Ostri Brgud and Ucka).

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Some important parts in this peninsula are: Porec, Rovinj, Pula and Plomin. Shipyards are in Pula. Lovran and Opatija are seaside health resorts.

Communication between the Istrian sector and hinterland is difficult due to the mountain ridge of Cicarije. The only railway line Pula - Pazin - Divaca - St. Peter na Krasu (Pivka) - Ljubljana is insufficient, goes round and only a few kilometres west of the Italian frontierstone south-eastern from village Bazovica. Now, there is a new railway line from Lupoglav to Stalijs, and another one under the Ucka (tunnel) from Lupoglav to Matulje is under construction. This line will connect Istria as a whole, and especially Pula with Rijeka and hinterland.

Conclusion: The Istrian sector is not suitable for landing operations due to configuration of the shore, nor does it offer favourable conditions for offensive operations after a landing operation, because operations in the north would be difficult due to natural obstacles Cicarija - Ucka. However, Cicarija can serve to landed forces, if they succeed in dominating it, as a position from which they would be able to cover the landing of strong forces and as a good defensive position for the defence of Istria, as an important maritime-operational point, if attacked from inland.

By its geographical position in the Northern Adriatic, with its eastern coast facing the Gulf of Quarnero, and west facing Trieste and Venetian Bay, and in the vicinity of main ports of the Northern Adriatic - Rijeka, Trieste and Venice - Istrian Peninsula dominates over the Northern Adriatic.

Istria itself may be a strategic objective because of large reserves of first-class coal (Italy is short of coal), bauxite and special sand for the production of famous Venetian glass. Besides, political importance of Istria is great and, finally, in the war it may serve to the enemy as a base.

CROATIAN LITTORAL SECTOR. Includes Croatian Littoral. Mountain ridges of Velebit and Rijeka Karst extend along the shore. The height of the shore is 300 - 500 metres, and in the area of Velebit over 1,000 metres. The coast is not dissected. The following islands are in front of this sector: Krk, Cres, Losinj, Rab, Pag and a lot of small islands protecting it and blocking the entrance of Rijeka Bay (Gulf of Quarnero). These islands are separated from the mainland by Tihi Kanal and Velebit Kanal which is deep and navigable for all vessels. By its relief the coast is strong and suitable for defence. Quarnero islands are of limestone. Their shores are dissected and the deepest inlets are extending from north-west to south-east. Coasts are steep, and those facing east and north-east are exposed to strong winds. Islands of Cres, Krk, Rab, Pag and Losinj are hilly, and only here and there low and suitable for cultivation. North-eastern and eastern parts are bare, and south-eastern and western parts are covered with bushes. The islands of Silba and Olib are low (up to 80 metres), of limestone and partly covered with bushes. Islands extending from Losinj toward south-east up to the island of Ist are higher, with steep shores, of limestone, rocky and predominantly covered with bushes.

Some important ports within this sector are: Rijeka and Susak, our largest and most modern port; Bakar and Kraljevica, very good small havens. Crkvenica, Selce and Novi are of no military importance, are tourist places and serve to working people as resorts. Senj is separated by a steep mountain from hinterland and, as St. Jura, Lukovo, Jablanac, Karlobag, Starigrad and Obrovac, is of local importance.

The Croatian littoral sector is connected with its hinterland by

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these communications:

Rijeka - Ogulin - Karlovac - Zagreb (second-class highway and railway),
 Novi - Ogulin - Karlovac - Zagreb (second-class highway),
 Senj - Brinje - Josipdol - Karlovac (Second-class highway),
 Jablanac - Otocec - Karlovac and Otocec - Bihac (second-class highway),
 Karlobag - Gospic - Bihac (second-class highway) and
 Obrovac - Urbina - Bihac (Slunj) (second-class highway).

All these communications traverse Karst and enclosed area of Velebit, Velika and Mala Kapela and can be easily blocked and defended. Further on eastward they run along the Kupa and Una valleys and on along the Sava valley.

Conclusion: The Croatian littoral sector is unsuitable for landing operations due to the relief and morphologic features of the coast; it is suitable for defence, and landing operations of strong forces cannot be expected.

NORTH DALMATIAN SECTOR: The coast along the sector Nin-Sibenik is flat and hilly and accessible from the sea; along the sector Sibeni - Makarska the coast is steep, high and unsuitable for landing operations. From Sibeni to Split low mountain ridges are extending along the coast: Vilaža and Kozjak: from Split to Makarska there are Mosor and Biokovo, medium mountains. The coast is dissected and protected by many islands extending in two or three rows, except along the sector south of Sibeni to Drvenik Kanal (about 30 km), where there are no bigger islands.

Ports: Zadar (held by Italy for a long time; due to this the harbour is not built). Sibeni - by its natural position is a first-class harbour. There is Sibeni Channel first, and then a narrow, zig-zagging channel leading to the port; this channel can be blocked easily. The entrance is protected by the island of Zlarin and a lot of small islands (about 70). The port is under construction and its capacity is growing. Sibeni is connected with hinterland by a railway line and by a second-class highway via Drnis and Knin. Split is the most important port on the Dalmatian Coast with regard to its geographical position and communications with hinterland. In the middle of the entrance is the island of Dlovo. The islands of Drvenik, Solta and Brač form the outer protective line of the port. Split is connected with hinterland by two railway lines and several second-class highways. Other ports are small and only of local importance.

The island of Brač is the biggest island in Dalmatia (389 square km), about 500 metres high in average, of limestone, hardly passable, but well cultivated. Its southern shore is steep.

The island of Hvar is the longest Dalmatian island (about 65 km), hilly, covered with bushes, the outer (southern) coast is steeper than the northern.

The island of Vis is a hilly island, of limestone, but fertile, with steep coast - especially western and southern. It is very important from the strategic point of view as early as the Venetian Republic reigned over the Adriatic (from the XV century to 1797). Strategically, it is

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important due to its geographic position: in the middle of the Adriatic, half-way between the Gulf of Trieste and the Strait of Otranto, and at the same time the westernmost bigger island as an outpost in front of Middle Dalmatia. In the XIXth century, the English realized its importance, and in 1806 their naval forces, together with the French and Russian Navy, entered the Adriatic, took the island of Vis and were holding it in possession until 1816 when, by the decision of Vienna Congress, it was given to Austria. Italy tried to occupy it in 1866, but the Austrian Navy defeated Italian naval forces in the vicinity of that island. Today, the island of Vis is a vital operational point in the Adriatic.

Communications between this sector and hinterland are:

Zadar - Benkovac - Knin and Vodice - Knin (second-class highway),
 Sibeni - Drniš - Knin (second-class highway),
 Split - Knin and Split - Sinj - Livno - Kupres - Jajce - Banja Luka (second-class highway),
 Omis - Duvno - Kupres and Omis - Imotski (second-class highway),

From Zadar to Makarska there is a second-class highway running along the coast; it runs north-westward to Rijeka and Labin and south-eastward to Ulcinj.

The Railway line Sibeni - Perkovic and Split - Perkovic and further on to Knin forks to Gospic - Ogulin - Karlovac - Zagreb and along the Una valley to Bihac - the Sava valley (Šunja).

The railroad Zadar - Knin is under construction. In addition to economic importance, it is very important from military point of view, for it connects Zadar, the biggest town and port in North Dalmatia, with hinterland and makes possible quick concentration of forces for the defence of the northern part of North Dalmatian sector (Kotari), which is suitable for landing operations.

Conclusion: North Dalmatian Sector, considering configuration of the coast, is more suitable for landing operations in the north, i.e. from Nin to Sibeni, while, with regard to the open shore, i.e. that is not protected by islands, it is more suitable in the part south of Sibeni, from the island of Zlarin to the island of Drvenik Mali. The other parts of the North Dalmatian Sector is unfavourable for landing operations due to steep and high rocks and a lot of big islands off shore. All communications from this sector run divergently: to the north and north-east: the Sava valley, eastward to the Neretva valley, Mostar and Sarajevo. A number of parallel mountain ridges of medium height in the close hinterland of this sector makes operations from the shore towards inland difficult to a considerable extent, and facilitates the defence.

SOUTH DALMATIAN SECTOR. The shore is steep and up to 1000 metres high, except around the mouth of the Neretva. About 12 km south-east of the mouth of the Neretva, there is the inland Klek - Neum (6,5 X 0,8 km), navigable even for the biggest ships. This sector is protected by the islands of Brač, Hvar, Korčula, Lastovo, Mljet, a group of islands in front of Dubrovnik and peninsula Pelješac. The Ston Isthmus, 1300 metres wide, connects the Pelješac Peninsula and the mainland. Pelješac is about 70 km long, and from 3 to 8,5 km wide. Along the whole length of the peninsula extend two narrow low ridges; they are mostly bare, falling abruptly into the sea.

From Dubrovnik to Cavtat the shore is very steep, with a few small

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islands in front of it.

Along this sector there are the following ports:

Makarska - not very important; a resort for working people. About 7.5 km south-east is village Podgora in an inlet of the same name, the cradle of our Navy.

Ploce - in the mouth of the Neretva, under construction now, intended to be a modern harbour, protected from all winds, with long pier. The port is connected with Sarajevo by a railway line and a second-class highway.

Dubrovnik (Gruz) - is the best built port in South Dalmatia, navigable for all ships. Connected to Sarajevo by a railway line and a second-class highway.

Cavtat - of the same importance as Makarska.

Communications with the hinterland:

Makarska - village Kozica - Imotski - Duvno - Kupres - Bugojno and Makarska - Vrgovac - Ljubuski - Mostar (second-class highway),

Ploce - Metkovic - Sarajevo (second-class highway and railroad),

Dubrovnik - Metkovic - Mostar (second-class highway),

Dubrovnik - Hum - Metkovic - Mostar (railway),

Dubrovnik - Trebinje - Stolac - Mostar or Dubrovnik - Trebinje - Bileca - Nevesinje (to Bileca second-class highway and railroad, and on second-class highway only),

Cavtat - Dubrovnik or Cavtat - Hercegovni (second-class highway).

Conclusion: South Dalmatian Sector is less favourable for landing operations and of little influence on our possible theatres of operations.

THE SECTOR FROM CAVTAT

TO THE MOUTH OF THE BOJANA

Closed towards inland by mountainous terrain like other sectors, except at Ulcinj in the direction of Scutari. Open towards the sea, for there are no islands in front of it. The coast from Cavtat to the Boka Kotorska Strait is predominantly bare and steep, and here and there very steep, rocky and of limestone.

Important bays are: Boka Kotorska, Budva and Bar.

There are many ports in Boka Kotorska, and most important are: Hercegovni, Zelenika, Tivat and Kotor. Boka Kotorska is a large haven, well protected by the surrounding mountains, but insufficiently connected with hinterland; it has only one way out to the high seas. It is surrounded by mountains of medium height that are bare, of limestone and steep.

Budva, Bar and Ulcinj are local ports. The railway line Belgrade - Bar, which is under construction now, will make Bar the main sea port for Serbia, Macedonia and Montenegro.

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Connection with the hinterland:

Gruda - Trebinje (second-class highway).

From Boka Kotorska: Hercegovni - Crkvice and Risan - Crkvice - Bileca - Avtovac - Kalinovik - Sarajevo, i.e. Kalinovik - Foca (second-class highway),

Risan - Crkvice - Niksic - Savnik - Pljevlja - Vardiste (second-class highway),

Kotor - Danilovgrad - Niksic (second-class highway),

Budva - Cetinje (second-class highway),

Bar - Virpazar - Titograd (road and railway line out by Scutari Lake, second-class highway).

Conclusion: Due to relief and geographic features of the shore, close and deeper hinterland, the sector is not suitable for landing operations or operations conducted by stronger forces.

CONCLUSION ABOUT THE FRONTIER

ALONG THE ADRIATIC COAST

In the main, our frontier along the Adriatic Coast protects our territory well. This is the result of topographic features of the greatest part of our coast that is protected by many islands and also of topographic features of both close and deeper zone of Dinara Mountains which are extending parallel to our coast.

The strongest sector is the Croatian littoral sector, and then the Sector from Cavtat to the Bojana (Montenegrin Sector), although not protected by islands; then South-Dalmatian and North-Dalmatian sectors and, finally, as the weakest, the Istrian Sector.

Considering the relation between individual sectors and the whole territory of our country, their importance is increasing from south-east to north-west. This because North-Dalmatian, Croatian littoral sector and Istrian Sector are nearer to our vital economic regions and are better connected with them. Therefore, they are more important from the military point of view. However, when once standard gauge track Sarajevo - Ploce and new railway line Belgrade - Bar are open to traffic, the economic and military importance of South-Dalmatian and Montenegrin sectors will be greater.

ALBANIA

The length of the boundary is 465 km. It runs along the Bojana river first, then in the form of an arch with sharp bends over the Prokletije encircles the northern part of Albania, separating it from FR of Serbia and Montenegro, descends down to the south with the end on Prespa Lake.

The boundary runs along the Bojana river from its mouth up to 2.5 km west of village Dajci, where it leaves the Bojana and runs straight to the north over the eastern slopes of Rumijska, leaving the summit Tarabosi to Albania, and at village Zogaj appears at the southern shore of Scutari Lake. Then it cuts the Scutari Lake with two angles of 90° and climbs to the high summits of Prokletije. Here it penetrates into our territory in the form of a sharp wedge in the vicinity of the summit Iljina Glava (elevation 2,176 m) and then in the

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form of an arch south of Gusinje and Plav appears at the Bogioevica mountain (half a km south-east of the summit Maja a Spalit - elevation 2,358 m). From here the arch winds towards south-east, running down to Metchija and along its south-western border, over Cafa Morines and Cafa Prusit, cutting the Pastrik (elevation 1,989 m), the river Beli Drim and the Koritnik (elevation 2,394 m). From Metchija to Ohrid Lake the boundary runs across high mountains southward: Kolobaku (elevation 2,174 m), Korab (elevation 2,764 m) and Desat (elevation 2,375 m), from which it runs down to the valley of the river Crni Drim and 8 km along this river, then up to the Jablanica (Crni Kamen, elevation 2,258 m) again. From the Jablanica the boundary runs down to Ohrid Lake, cutting its south-western part and over the Galicica to Prespa Lake where the three boundaries - FFRY, Albania and Greece - meet.

The boundary is natural along the whole length except from the mouth of the Bojana river to the Scutari Lake, because it does not run along this river, but leaves it west of village Dejci, ceding its upper part to Albania completely (both banks).

In the sense of ethnology, the boundary runs so that a considerable number of Shqiprians (about 750,000), that settled themselves in Metchija and Kosovo Polje in the time of the Turkish reign, are left in our territory.

In addition to the big arch, formed by the boundary line around the northern part of Albania, which might be of strategic importance, in the northern part of that arch - in the Prokletije - there are two juts which might be important from tactical-operational point of view only, although high mountains decrease their importance. The point of the western jut which is the northernmost point of the Albanian territory (the summit Iligina Glava) is important because it is only about 10 km far from our vital line: Pec - Andrijevica - Titograd, and also from the cross-roads Andrijevica. The eastern jut in the north reaches the Bogioevica mountain and from the above mentioned line, from its highly vulnerable part - Cakor - it is not far more than about 15 km.

Natural openings are: Scutari, Ohrid and Prespa Lakes, then the valley of Crni Drim (west of Debar) and the valley of Beli Drim along the line Prizren - Kukes, as well as the upper part of the Bojana river (Bar - Scutari); all these openings can be blocked and defended easily.

General characteristics of this boundary line is that, except the lake district, it runs along the ridges of medium and high mountains, that are hardly passable, wild, scarcely populated and with few communications that never run across them, but go around.

With regard to the relief, the boundary line may be divided into four sectors: Titograd sector, Prizren sector, Debar sector and Ohrid sector.

TITOGRAD SECTOR. Extends from the mouth of the Bojana river to the Bogioevica mountain exclusively (watersheds of the Lim and the Beli Drim). The zone from the sea to the Scutari Lake is flat, and the Bojana valley is swampy, malarious and unhealthy. While the boundary line is running along the Bojana, considering its valley being flooded from time to time, it is protected by this river, but along its upper part both banks are in possession of Albania. Only one good road (second-class highway) crosses the frontier within this maritime sector from Scutari to Bar and Uleinj. There are two roads from Uleinj to the Bojana river and further on to Scutari. Behind the frontier, in our territory, is the Rumija mountain (elevation 1,593 m) traversed by horse-paths and unpopulated. East of this zone, in the Albanian territory, a seaside plain begins full of lagoons, lakes and marshes. The Scutari Lake is a natural and big obstacle for the side that has no vessels.

The Scutari Lake has an inlet 12 km long in the direction of north-east that cuts the plain and swampy ground between the Lake and the slopes of

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the Prokletije ranges, forming a definite defile at village Hoti.

In our territory in the hinterland is the plain Zeta with Titograd in it, and on the Albanian side there is a flat zone from 5 to 10 km wide extending towards Scutari. The second-class highway from Scutari to Titograd crosses the frontier at village Hoti, entering the abovesaid defile. This defile may be blocked and defended easily, and, consequently, it is very important from the operational-tactical point of view. From the Scutari Lake to the Bogioevica mountain the boundary line is running along the Prokletije ranges. These are almost impassable even to alpine units.

The Zeta plain may be used for the concentration of troops to operate along this sector. For the bringing up of supplies and evacuation may be used the Valley of the Zeta river along which runs a good road and the railway line to Mksic and the highway to Getinje and Kotor.

PRIZREN SECTOR. Extends along the frontier from the Bogioevica mountain to the summit Kolobaku inclusively. This sector forms the north-eastern and eastern parts of the great arch of the boundary around Northern Albania. The northern part of this sector extends over the high mountains Bogioevica and Junicka Planina, whose ridges are bare, rocky and craggy; towards Albania their sides are very steep, bare and rocky, and facing our territory they are not very steep and are covered with dense forests; they are difficult to pass. The sector facing Djakovica is the weakest in the topographic sense, for the boundary line runs down from high mountains to 1,000 m and lower along over 30 km, and the Albanian side is higher at several places. This part is passable in the Albanian territory, although there are no good communications, especially on the Albanian side.

The southern part of this sector is mountainous terrain; it runs over the high mountains: Pastrik, Koritnik and Kolobaku. The Pastrik and the Koritnik are forested, but the part south of the Koritnik is woodless and covered with pastures. The summits of these mountains are rounded but their sides are steep; they are hardly passable. Between the Koritnik and the Kolobak there are two paths worth mentioning: Prizren - the valley of the Flavaska Reka - village Vraniste - village Kukes (in Albania) and Tetovo - the Tetovska Reka - village Brod - village Bica; (in Albania).

In our territory there are the following communications running to the frontier line: third-class road from Djakovica to Cafa Prusit and a fourth-class road from Djakovica to village Ponoševac - village Morina - Cafa Morines to village Tropoja in Albania. Besides, there are several bad roads and horse paths.

Through the southern part of the Prizren sector flows the river Beli Drim; it is narrow and deeply cut between the mountain massifs of Pastrik and Koritnik. The highway Prizren - Kukes runs along this valley. The valley can be blocked and defended easily.

On the Albanian side only horse paths lead to the frontier. The boundary line runs along the watersheds of the Drim and the Beli Drim. Once the frontier is captured, there are no positions from which Metchija could be defended.

Conclusion: The Prizren Sector is very important to us, because, along it we have to defend our region Kosmet which, by its passability, communicability, fertility, population and other factors is a very suitable concentration area even for strong forces. Thanks to its communications with all neighbouring regions (via Cakor with the valley of the Lim, Novi Pazar, the valley of the Iber and the Zapadna Morava, with Kursulija, Krusevac and Nis, with Medvedja, Lebane and Koskovac, with Gnjilane, Vranje, Kacanik and Skoplje) it is a first-class

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operational-maneuvering area. A comparatively small distance from Albania to Bulgaria along the line Prizren - Urosevac - Bosiljgrad (about 170 km) makes this sector highly vulnerable.

DEBAR SECTOR. Extends from the summit Kolobaku exclusively to Ohrid Lake exclusively - at the Cafa San saddle. In the main, this sector extends along high mountain ranges. The boundary line extends over the ridges of Korab, Desat and Jablanica. These mountains are pathless, rugged, almost woodless, unpopulated, with a few footpaths only. Natural gates in the valley of the Crni Drim are important; a second-class and a third-class highway run along it: Debar - Tirana and Debar - Peskopoje and Debar - Elbasani. Tetovsko Polje (Polog), Struga and Kievo valleys may serve as concentration and bivouac areas.

Conclusion: Considering mountainous character of terrain within this sector, the whole economic potential of this region is limited; operations conducted from any side would suffer from the unsuitability of terrain features; due to this, only small units could be engaged, except along the passage at Debar.

OHRID (LAKE) SECTOR. Includes two lakes - Ohrid and Prespa lakes - and the high mountain Galicica (elevation 2,288 m) between them.

Both sides of the Galicica, along the borders of Ohrid and Prespa lakes runs a road to Albania (Ohrid - Korca and Resan - Korca), as well as the road along the western shore of Lake Ohrid: Struga - Elbasani or Struga - Korca; on the ridges and slopes there are a few horse-paths only.

There are no areas suitable for concentration and stationing of large units, except the valley on the northern border of the lake (Struga and Resan).

Some vessels may be used by either of the warring parties (assault boats) in this frontier zone.

Conclusion: Topographically, the frontier with Albania is very strong, for it mostly extends along the ridges of high mountains, and a little along hilly and flat ground and across lakes.

The Prokletije is topographically the strongest part; then from the Pastrik, Koritnik and Korab up to Desat inclusively and, finally, the Jablanica and Galicica mountains. The weakest parts of the frontier are: the river Bojana, Lake Scutari and the part west of Djekovica, the part around Debar and Lake Ohrid. Weak land sectors can be fortified; lakes can be blocked by obstacles and protected by naval craft.

This sector, as a whole, is unfavourable for the action of hostile armoured and motorized units due to its orographical and hydrographic features (mountains, the river Bojana with marshes, lakes), poor communication and passability.

Considering topographic features and passability, as well as the operational importance of the regions which it protects, the Prizren Sector is most vulnerable, and within it, the part west of Djakovica.

THE GREEK FRONTIER

The length of the frontier is 262 km; general direction of the extension: west-east. It begins at Lake Prespa, at the convergence of Yugoslav, Greek and Albanian frontier. From here it runs eastward, crosses the Baba

mountain, running down to Bitolsko Polje and crossing it south of Bitolj. Bitoljsko Polje is called Pelagonija. Further on it ascends the Nidze mountain and running along the ridges of the Kajmakalan (elevation 2,521 m), the Dobro Polje (1,977 m) and the Kozjak (elevation 1,814 m), drops down to the saddle between the Nidze and Kozuf, then crossing the latter, touches the peaks of the Dudice (elevation 2,050 m) and the Zelenbeka (elevation 2,171 m) and drops down to the Gavgelija lowland area. South-east of Gavgelije it crosses the river Vardar and runs towards the southern part of Lake Dojren; here it bends northward, crosses the lake, and runs northward to the peak Catal Cesma Tepe (elevation 1,474 m) in the Belasica mountain. With a sharp bend it runs along the ridge of the Belasica to the convergence of the Yugoslav, Greek and Bulgarian frontier (elevation 1,880 m).

Topographically, the frontier is the strongest in the Belasica mountain and in the Nidze-Kozuf area, and the weakest in the Lake District and in Bitoljsko Polje.

Ethnologically, the frontier extends so that about 270,000 Macedonians were left in Greece.

The frontier line is a slightly zig-zag line, with small juts here and there, and with two sharp bends: south of Lake Dojran and in the Belasica mountain.

Gates: The Lake Prespa area, the plain of Pelagonija, the Vardar Valley and the Lake Dojran area.

In its greatest part the frontier runs along the ridges of high mountains that are strong positions, suitable for defence.

According to its relief, the whole frontier may be divided into three sectors:

- Bitolj Sector;
- Mountain Sector;
- Vardar Sector.

BITOLJ SECTOR. Extends from the convergence on Lake Prespa to the peak Starkov Grob (exclusively). From the convergence the frontier runs across the Lake eastward for about 12 km. Greater part of Lake Prespa belongs to our country (two-thirds). It is the easiest and shortest way from Albania and Greece to Resen lowland area, if the above mentioned countries have ships on Prespa Lake.

Along the eastern shore of Prespa Lake extends a narrow flat zone, from 0,5 to 2 km wide. In it there is a third-class highway from Resen to Ljubojno and, further on, towards Greece, an ordinary road. Considering its narrow width between the Lake and the Baba mountain, this part of the sector is of small capacity and is not very important.

The Baba mountain is between Prespa Lake and Bitoljsko Polje. It is a ridge of high mountains (the summit Pelister - elevation 2,600 m) with bare, here and there stony peaks, and wooded, steep and partly rocky slopes. A horse-path runs along the ridge.

East of the Baba mountain to the western slopes of the Nidze mountain is the most important part of the Bitolj sector - Bitoljsko Polje. It is wide, about 25 km, well populated and cultivated, partly flooded and muddy along the river Crna Reka, especially in autumn; there are no woods in it. Vital communications run along these gates from Greece to Yugoslavia; four second-class

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highways (Bitolj - Velusino - Larin; Bitolj - Sakulovo - Banica; Brod - Bac - Sakulovo and Brod - Zivojno - Banica) and a railway line (Bitolj - Sakulovo - Voden - Salonika), which makes operations of strong armoured and motorized forces possible.

Conclusion: The weakest point on this sector is 25 km wide passage in Bitoljsko Polje, that is, between the Baba mountain and western slopes of the Nidze mountain in which strong forces of all arms could operate. From the topographic point of view, the sector between Prespa Lake and Bitoljsko Polje (the Baba mountain) is the strongest.

MOUNTAIN SECTOR. Includes high mountains Nidze and Kozuf (from the peak Starkov Grob - elevation 1,876 m) inclusively to elevation 1,034 m south of village Hum. This sector is very strong in the sense of topography, very steep southward towards Maglen lowland and rocky; northward towards the river Crna Reka slopes of these mountains are not steep, and towards Kavadarci and Negotino down to the valley of the Vardar their slopes are very long. This sector is suitable for deep and strong defences in our territory. The Nidze and the Kozuf are in our territory, wooded from 1,000 to 1,200 m and in Greek territory they are bare.

Only horse-paths and foot-paths cross the frontier on this sector. On both sides of the frontier there are some roads constructed by the Allies and German-Bulgarian forces on the Salonika front in World War I; none of them crosses the ridge.

Conclusion: This sector is naturally strong and suitable for defence, and in cases of offensive operations towards south offers advantages to the northern side, for the terrain drops gradually towards Solunsko Polje (Salonika Field).

VARDAR SECTOR. Extends from the eastern slopes of the Kozuf mountain to the convergence in the Belasica mountain. It drops down from the elevation 1,034 m to the Gevgeliya lowland area along the long, mainly bare ridge and to the Vardar valley which it crosses southeast of Gevgeliya. Slopes on both sides are good and strong positions. The Gevgeliya lowland area is an important corridor, wide about 22 km, which is, more or less, broken terrain; its western border are the slopes of the Kozuf mountain, and the eastern (west of Lake Dojran) hilly ground. Along the Vardar valley run the railway and highway Skoplje - Salonika. In our territory the Gevgeliya lowland area is squeezed by Demir Kapija (defile), and in the Greek territory by Giganska Klisura (another defile) through which run communications from Skoplje to Salonika.

The frontier line appears at Lake Dojran from the south (east of village Stari Dojran) running across the lake for 8.5 km. Of the total surface of the lake, Yugoslavia is in possession of about 45 square km, or almost two-thirds, while one-third belongs to Greece. The lake is about 6 km broad.

Lake Dojran is surrounded by hilly ground; on the eastern shore of the lake is Greece, between the Krusa mountain and the lake, there is a gate through which a railway line runs eastward - to the lower Struma (Seresko Polje); in our territory, a second-class highway goes round the lake from the south and from the west, running to Valandovo, Strumica and Stip. Along this communication the valley of the Vardar can be by-passed, because the Vardar Valley, due to frequent narrow defiles, is an obstacle for operations from the south to the north and vice versa.

Between Lake Dojran and the Belasica mountain there is a strip of land passable along the lake. The frontier line runs along the eastern slopes of the Kara Tas mountain, which is in our territory, overshadowing and blocking this passage.

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From the elevation 1,474 m, the frontier line, after a sharp bend, runs eastward along the ridge of the Belasica mountain to the convergence (elevation 1,880 m). The Belasica is a mountain of medium height (almost 2,000 m high) with a narrow ridge and narrow foothills (only 7-8 km), with steep slopes on both sides. In our territory it is wooded almost from the foothills to the top; in Greek territory only the upper part is wooded. It is almost impassable, especially due to the steep sides. Only paths can be found on it. Inhabited localities are only at the foothills.

Conclusion: Flanks are the strongest points on the Vardar Sector: the right, leaning against the Kozuf mountain (elevation 1,034 m south of village Hum), the left against the Belasica mountain. The right flank is tactically stronger, because the eastern spurs of the Kozuf mountain make the organization of a deep defence possible; the left flank is tactically weaker, because on the very steep and narrow ridge of the Belasica mountain deeper defence cannot be organized.

In the centre of the Sector the weakest parts are the Gevgeliya lowland area and Lake Dojran. The parts between the Vardar and Lake Dojran, as well as between this lake and the Belasica mountain is low mountainous and hilly ground that makes the organization of deep and strong defence possible.

CONCLUSION ABOUT

THE GREEK FRONTIER

The greatest part of the Greek frontier is topographically very strong, because seven-tenths of the frontier line runs along the ridges of high mountain, mountains of medium height and hilly ground, while only about three-tenths across lowlands, lakes, broken and hilly ground.

In the sense of topography the strongest parts of the frontier are the mountains Baba, Nidze, Kozuf and Belasica. The weakest parts are: Prespa Lake, Bitoljsko Polje, Gevgeliya lowland area and Lake Dojran.

From the economic and military point of view the most important parts of the frontier are Bitoljsko Polje and the sector between Gevgeliya and Lake Dojran. This because of their passability, communicability and economic importance of regions behind them (Bitoljsko Polje, Prilepsko Polje, the Strumica lowland area and Radovic Polje).

THE BULGARIAN FRONTIER

The length of the frontier is 537 kilometres. General direction of the extension: south - north. The frontier begins in the Belasica mountain, at the convergence of the Yugoslav, Greek and Bulgarian frontier (elevation 1,880 m) six kilometres west of the peak Tumba (elevation 1,889 m). From here it abruptly drops down to the river Strumical valley, crosses this river and runs up the Ograzden mountain, crosses its main ridge and runs northward across the eastern part of the Malesevske Planine mountains and then along the ridge of the Vlainska Planina mountain; further on, the frontier line bends north-westward, running up the Osogevska Planine Mts. (the summit Rujan - elevation 2,252 m), crosses the main ridge of these mountains and drops down steeply toward the saddle Deve Bair east of Kriva Palanka. From here it runs northward along a zig-zag line across the Zeravinska Kuka (elevation 1,429 m), the Miljevske Planine Mts. (elevation 1,732 m) to the saddle Dascani Kladenac and then north-eastward across the Ruj (elevation 1,706 m) and the Breben mountain, crossing the river Nisava east of Dimitrovgrad. From here it extends north-eastward across the

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Vidlic mountain, the peak Srebrna Glava (elevation 1933 m) and along the main ridge of the Stara Planina mountain, where, after a sharp bend, it runs along the ridges of this mountain and its farthest northern spurs to the river Timok and along this river to the convergence of the Yugoslav, Bulgarian and Rumanian frontier at the mouth of the Timok river.

The frontier is mainly natural, for it runs along mountain ranges and watersheds, except between the Srebrna Glava and the Krvavi Kamen (elevation 1933 m) east of Lake Vlasina. From the ethnical point of view, the frontier line is traced correctly, except the southern part where it cuts the ethnic territory of Macedonia, leaving its considerable part (Pyrin Macedonia with 200,000 Macedonians) to Bulgaria.

The form of the frontier is typically broken with four large juts, of which two juts from our territory towards Bulgaria (the northern jut from Pirov and Dimitrovgrad toward Berkovica and Sofia, and the southern jut in the Delcevo-Berovo-Strumica area in the direction of the valley of the river Struma) and two juts from Bulgaria towards our territory (from Vidin and Belogradchik in the direction of Zajecar and Knjazevac, and the southern jut from Trn to Custendil towards the valley of the Južna Morava). All these juts are very important from the operational point of view.

Gates:

- the valley of the river Strumica in the direction of Petric;
- the valley of the river Nisava towards Sofia;
- the lower Timok towards Vidin.

Important saddles: Džami Tepe (east of Pehoevo), Černa Skala (northeast of Delcevo), Deve Bair (east of Kriva Palanka), southeast of Bosiljgrad (in the valley of the river Dragovatica) and northeast of Bosiljgrad at village Strezimirovci (in the valley of the river Jerma, Dascani Kladenac (east of village Kalno), St. Nikolas (in the Stara Planina mountain - east of village Kalno), Kadibogaz (east of Minicevo) and Vrska Čuka (southeast of Zajecar).

Considering the relief, traffic and economic conditions, the frontier zone may be divided into three sectors: southern, middle and northern.

SOUTHERN SECTOR. Extends from the convergence of the Belasica mountain to the Miljevske Planine Mts. exclusively. The frontier line runs, except in the valley of the river Strumica, between the river Vardar (Bregalnica) and the river Struma to the Zerevinska Čuka; here, it leaves this area in our territory running northeastward crossing the river Dragovatica and some smaller tributaries of the river Struma. This sector is strong from the topographic point of view, and especially: the Ograzden, the Malesevske and the Osogovske Mountains; it is weaker in the valley of the river Strumica and east and northeast of Delcevo. The average heights are about 1,700 m above sea level. Wooded in the southern and middle part more than in the northern from the saddle Deve Bair to the Miljevske Planina Mts; thinly populated and of no economic potential. Passable in the Delcevo and Bosiljgrad area; communicability: poor.

Important gates, saddles and communications are:

- along the valley of the river Strumica: second-class highway to Stip and Valandovo;
- Breznice - Pehoevo (road for vehicular traffic);
- Gornja Daumaja - Delcevo - Kocani, second-class highway (except 5 km from the frontier line in our territory - a fourth-class road);

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- the saddle Deve Bair (in Bulgarian territory a railway and highway, in our territory a second-class road);

- the valley of the river Dragovatica from Custendil to Bosiljgrad and Vranje (second-class highway).

Conclusion. The southern sector is predominantly the eastern frontier of PR Macedonia. It is to protect the Vardar valley and our communications in it and communications with Salonika and Greece in general. Due to this, this sector is very important and highly vulnerable at the same time, which was proved in the offensive operations from Bulgaria into our country in World Wars I and II.

MIDDLE SECTOR. Extends from the Miljevska Planina Mountains inclusive to the peak Srebrna Glava inclusive. This sector is partly forested, difficult to pass, with poor communications, except in the valley of the river Nisava. Thinly populated and of little importance from the economic point of view. The valleys crossed by the frontier line (the rivers Jerma, Gabre, Nisava and Vlasica) are narrow here and there and have defiles that are easy to defend.

Important saddles, gates and main communications on this sector are:

- the valley of the upper Jerma at village Strezimirovci - the Vlasina - Vladicin Han (second-class highway);
- the saddle Dascani Kladenac (a path in Bulgarian territory and a fourth-class road in our territory) - Vlasotinci - Leskovac (from village Dejan a second-class highway);
- northeast of Trn - the valley of the river Jerma - the river Babusnica - Bela Palanka - or the Babusnica - Vlasotinci - Leskovac (second-class highway);
- the valley of the river Nisava at Dimitrovgrad - Pirov - Nis (first-class highway and railway);
- the upper Vlasica - village Visoka Rzana - Pirov (first-class highway);
- this sector is predominantly mountainous: average height; 1700 m above sea level.

Shortcomings: between the Miljevska Planina Mountains and the Dažanski Kladenac the frontier line gets nearer to the valley of the river Južna Morava between Vranjska Banja and Grdelica along which our most important lateral communications parallel to the front and communications to Salonika run. Along the line Strezimirovci - Črna Trava - Predejane that distance is under 30 km. Besides, this sector is thinly populated, economically poor, and there are no suitable areas for concentration (except Pirovsko Polje), staging and supply of troops.

Conclusion: This sector is important to both sides, and to us it is vulnerable because of the vicinity of the frontier to the river Južna Morava. In the history of warfare we find that the Bulgarians or their allies have always attacked our territory along the vital communications: Sofia - Pirov - Nis and across the saddle Deve Bair - Kriva Palanka - Kumanovo - Skoplje, and along secondary lines of operations Strezimirovci - Vlasina - Surdulica - Vladicin Han and Bosiljgrad - Kriva Feja - Vranjska Banja with the aim of cutting the valleys of the Morava and the Vardar, in which they often were successful.

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NORTHERN SECTOR. Extends from the Srebrna Glava (exclusively) to the convergence on the Danube. To the saddle St. Nikolas it runs across high mountains and mountains of medium height, the greater part of it forested, especially on the Bulgarian side; difficult to pass, broken ground with poor communications. From the saddle St. Nikolas to Vrska Cuka it runs across mountains of middle height first and then across hilly ground. This part, too, is forested on the Bulgarian side more than on ours. Passability and communicability are better, especially in the Bulgarian part of the frontier zone. North of Vrska Cuka the frontier line runs across hilly ground to village Bregovo where it appears on the river Timok and along this river to the convergence. This part is passable, with better communications, thinly forested, densely populated and economically more developed. A part of this sector forms a deep wedge into the Bulgarian territory in the direction of Berkovica.

The Bulgarian jut in the direction of Zajecar and Knjazevac brings the front nearer to the valley of the river Timok and lateral communications parallel to the front in it, to the mining area Bor-Majdanpek and to junction Zajecar and Knjazevac. The shortest way to Belgrade is from this jut, and, besides, the part of the frontier from the saddle Kadibogaz to the peak Srebrna Glava - in the depth of about 60 km - is on the flank of the Nisava valley.

Considering the relief, the frontier is topographically strong in the middle and on the right flank, and weaker on the left flank; therefore, our mines of strategic raw material around Bor and the vital basin of coal in the Timok valley are insufficiently protected by nature.

From the mouth of the river Timok to village Bregovo the frontier line runs along the Timok for 15 km which is muddy and unfordable at this place. The right, Bulgarian bank, is a little higher than the left. Further on southward the distance between the frontier and the river is from 5 to 15 km, which does not offer safety to our lateral communication Nis - Negotin and other important objects.

From the frontier ridge the ground is steep towards the Timok valley, while it is sloping towards Bulgarian territory and the Danube. From the mouth of the Timok to Vrska Cuka the terrain is easy to pass, well populated, thinly wooded, but nevertheless, without good communications. From Vrska Cuka southward the terrain is broken, wooded, thinly populated and short of communications; abruptly falls down into the valleys of the Timok, the Beli Timok, the Trgoviski Timok and the Visocica and, in general, it is difficult to pass. On the Bulgarian side, due to gradual sloping of the ground, circumstances are more favourable in any case - passability is better, the number of good communications is greater, military units could quickly and easily appear on the frontier line, the area is more densely populated, the reserves of food and forage in the vicinity of the frontier are greater. Owing to this, after the capture of the points of resistance along the frontier line, the advance of Bulgarian forces toward the Timok valley is easier and shorter than our penetration into the Danube valley in Bulgarian territory.

Conclusion: On the northern sector our vital mining areas (Zajecar, Bor, Majdanpek) should be protected and the shortest ways from Bulgaria to the valley of the river Velika Morava and further on to Kragujevac and Belgrade should be blocked.

From the operational point of view, the left flank of the middle sector and the right flank of the northern sector are closely connected. This connection is necessary, for it is imposed by the parallel extension of the line Nis - Sofia and the frontier line from the saddle Kadibogaz to the peak Srebrna Glava; besides, the terrain between the Timok and the Nisava is passable and has good communications.

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CONCLUSIONSABOUT THE
BULGARIAN FRONTIER

The frontier, as a whole, is topographically strong. The weakest points are the Timok Gates north of Vrska Cuka, the Nisava and Strumica Gates and the lowland areas northeast of Delcevo.

Considering the relation between frontier zones and the territory of Yugoslavia, its economic and political centres, middle and northern sector are more important. However, the actual military and political situation in 1915 and 1941 gave priority to the southern sector.

THE RUMANIAN FRONTIER

The length of the frontier is 557 km. General line of extension: southeast-northwest. The frontier begins at the convergence of the Yugoslav, Bulgarian and Rumanian frontier at the mouth of the river Timok and runs along the Danube to the mouth of the river Nera. From here it runs along the river Nera to village Kusici where it leaves the Nera and curves sharply east and north around Bela Crkva; at village Vojvodinci it turns northeastward and after a big arch around Vrsac runs northwest to east of Jasa Tomic, south and west of Jimbolia (in Rumania) to the convergence of the Yugoslav, Hungarian and Rumanian frontier (at village Raba). The frontier line is natural along the Danube only.

From the ethnical point of view, the frontier line cuts mixed population, leaving a number of Rumanians in our territory and a number of our people in Rumanian territory.

The frontier line is considerably broken, especially along the Danube, at Vrsac and Bela Crkva. Notable Rumanian juts:

Vlasko, whose point is at Brza Palanka,

Djerdap (Iron Gates), whose point reaches Donji Milanovac and the mouth of Porecka Reka,

Bazjas, between the Nera and the Danube with the ridge Lokva, whose point reaches village Vravec Gaj,

Oravica, whose point reaches village Vojvodinci in the vicinity of the road and railway line Vrsac - Bela Crkva.

Our juts: the jut of the Danube pointing Turn Severin and Orsava whose furthest point is the Kljuc area; east of Bela Crkva and east of Vrsac.

Considering the relief and hydrographic features, the frontier may be divided into two sectors: the Danube Sector and the Banat Sector.

THE DANUBE SECTOR. Extends from the mouth of the river Timok to the mouth of the river Nera. It is very strong, because the Danube is a very strong strategic obstacle. Considering the relief of the valley, it may be divided into three subdivisions: eastern, middle and western.

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The eastern subdivision extends from the convergence at the mouth of the Timok to the point where the Danube emerges from the Iron Gates at Tekija. The right bank is, in the main, higher than the left and thus is more suitable for crossing from our territory to Rumania. From this subdivision eastward a great plain spreads (Vlasko-Pontiska) opening the way to the granary of Rumania and its vital regions. From the mouth of the Porecka Raka (Donji Milanovac) to the mouth of the Timok the Danube juts into the Rumanian territory in the depth of about 30 km, and in width from 20 to 25 km. This jut is encircled by the Rumanian territory from three sides - southeast, northeast and northwest. According to its form and size it could be operationally important to Rumania; however, due to the width of the Danube and nature of its bank on our side - in the western part of the jut steep, and in the eastern overtopping - these advantages are insignificant.

The middle subdivision extends from Tekija to Golubac and includes the Iron Gates. Considering the features of the defile, high and steep, often rocky banks of the Danube, almost unapproachable from the south and from the north, mountainous terrain on both banks - the crossing of stronger forces is tactically and technically next to impossible.

The western subdivision extends from Golubac to village Ram. Along this part the Rumanian bank is considerably higher (Lokva), so that the crossing from the left to the right bank is quite easy. This subdivision is important to us, for it protects the approaches to the valleys of the rivers Velika Morava, Mlava and Pek.

Conclusion: On the Danube sector the strongest part is the middle subdivision, due to steep, high and rocky banks, as well as due to the lack of approaches in Rumanian territory, while there are three roads in our territory: from Brza Palanka across the Veliki Greben mountain and on to the mouth of the river Porecka Raka; along the valley of the river Porecka Raka from village Klokočevac and from Majdanpek to Donji Milanovac. All these three roads run towards a point - the mouth of the Porecka Raka.

The eastern subdivision is topographically weaker, especially its eastern part facing Mala Vlaska (Oltenijska); however, our bank is higher than Rumanian here. Being on the periphery, it is not of great operational importance; it protects the entrance of the Timok valley from the north and our mining region Majdanpek - Bor from the east and northeast.

The western subdivision is topographically the weakest, for the Rumanian bank is considerably higher and enveloping our frontier zone. Considering that this subdivision protects the approaches to the lower parts of the Pek, the Mlava and the Velika Morava and the approach to Belgrade along the right bank of the Danube, it is very important and, at the same time, highly vulnerable.

THE BANAT SECTOR. The frontier runs across a plain, unprotected either by relief or by rivers; it is wide open. This sector is bare except east of Vrsac and south of Bela Crkva along the ridge Lokva. The Banat sector may be divided into two subdivisions: southern and northern.

The southern subdivision extends from the Danube to the river Brzava. The terrain on the Rumanian side is almost along the whole sector higher than on our side and in the form of a horse shoe blocks all directions that lead from our side eastward. On the Rumanian side the terrain ascends and reaches 1,000 m above sea level, so that operations eastward would soon encounter well defended positions. On our side there are the Deliblato Sands (50-60 m high) which, in connection with Fenny, here and there swampy ground along the lower parts of the rivers Tams, Begej and Tisa, and with a good engineering organization, could serve as the first suitable position for the defence of Belgrade.

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This subdivision is jugged eastward in relation to the northern subdivision, and exposed to flank action from Timisoara, but, on the other hand, threatens this town from the south.

Gates:

- the valley of the river Nera, and
- the valley of the river Karas.

Conclusion: This subdivision is very important to Rumania, for the valleys of the rivers Nera and Karas are approaches to vital Rumanian metallurgic centres Anina and Resica. In our territory, communications to Pancevo and Belgrade run from this subdivision (distance from 90 to 100 km).

The northern subdivision extends from the river Braeva to the convergence. This zone lies in the plain, unprotected, and in its hinterland is the river Tisa, about 15 km distant in the north, and about 50 in other parts.

Numerous communications run northeast, convergently towards Timisoara and Arad.

Conclusion: For Rumania this subdivision would be enormously important, for operations could be conducted in the plain and along an orographically completely unprotected line of operations towards the capital, Belgrade, over which this frontier zone hangs from the northeast and from the north (the distance between Jasa Tomić and Belgrade is from 90 to 100 km).

CONCLUSIONS

ABOUT THE

RUMANIAN FRONTIER

This frontier zone runs along two different sectors: the Danube sector which is topographically very strong, with the Danube as an obstacle, strengthened by steep and high banks on both sides, which makes this sector impassable without large preparations and modern equipment: the Banat sector which is open and unprotected, without any stronger obstacles and passable always and everywhere. The degree of passability drops down in case of rainy weather due to muddy ground, which restricts movements of vehicles to roads with stony surfaces only; however, there are no roads of this type in the middle zone of the Banat sector.

THE HUNGARIAN FRONTIER

The length of the frontier is 623 kilometres. General direction of the extension of the frontier line: east-west. From the convergence of the Jugoslav, Rumanian and Hungarian frontier at village Raba, the line extends 14 km westward (air line) to the river Tisa, cutting it south of Szeged (Hungary); further on, westward, it runs north of Horgos, around Subotica and along a broken line southwestward towards the Danube, crossing it about 7 km north of the village Batina; then it runs southwestward across Baranje north of Beli Manastir towards the river Drava reaching this river 8 km east of Donji Miholjac. From here it runs along the river Drava cutting the new bed of this river, leaving many small bridgeheads in ours and in Hungarian territory. The only larger bridgehead at villages Zdale and Gele (23 km wide and 6 km deep) belongs to Jugoslavia. At Legrad the frontier line leaves the river Drava and runs along the river Mura to the mouth of the river Lendava. From here it runs for about 8 km along the

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river Lendava and further on northwestward crossing the upper parts of the Mala Krka and the Velika Krka, bending westward soon towards the convergence of the Yugoslav, Hungarian and Austrian frontier (elevation 380 m).

The frontier line runs along natural lines only along the river Drava and the river Mura.

From the ethnical point of view, the frontier line has been traced so that, due to mixed population, a certain number of our people have been left in Hungary, and some of the Hungarians have been left in our territory.

The frontier has the form of a big arch jutting southward, which gives opportunity to the southern warring party to advance towards the vital object - Budapest - convergently. Prekomurje is also an important jut.

Gates: Pannonia Plain, at Zdala, Gola, Kotoriba and Donja Lendava.

About a half of the total length of the frontier are rivers.

The Danube divides the Hungarian frontier into two sectors:

The right sector (eastern) - Vojvodina - from the convergence (Jugoslavia, Rumania and Hungary) to the Danube;

The left sector (western) - the Drava sector - from the Danube to the convergence (Jugoslavia, Hungary and Austria).

THE RIGHT SECTOR (the Vojvodina Sector) is divided into two subdivisions by the river Tisa:

The right subdivision (the Banat subdivision) extends from the convergence to the river Tisa for about 20 km. It is inserted between the river Tisa and the Rumanian frontier and is very narrow. It can be easily blocked and defended.

The whole sector lies in a plain, open and bare, except the narrow zone along the Tisa; passable, except during the period of rains. There are two railway lines: at Djala and Banatsko Arandjelovo - to Szeged.

The left subdivision (the Backa subdivision) extends from the Tisa to the Danube; this is the most important part of the frontier, for the shortest lines of operations run through it, considering the main strategic objects on both sides (Belgrade - Budapest). Its right flank is jugged a little northward, so that the distance to Budapest is only about 250 km.

Behind this subdivision is the Veliki Kanal (Great Canal) connecting Bezdán to Vrbas, Srbobran and Becej.

The Backa subdivision, together with the Banat subdivision, protects the granary of our country, for behind them are our main agricultural regions.

The whole right sector is in a plain, passable in all directions and topographically unprotected. It is completely bare, except in the centre (north of Subotica), where there are some woods, and along the left bank of the Danube, where there are narrow wooded zones.

On the right and left flanks of the subdivision the ground is considerably lower with two rivers - the Danube and the Tisa. Their characteristics are: abundance of water, slow current, considerable meandering, flooding of valleys and wide swampy zones along them. In the central part of the subdivision, in the area west of Horgos to Ridjica, the Backa Table extends (30-40 m high),

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communications with a part of the Posavina (the valley of the river Sava) from Jasenovac to Zagreb, although in that direction the ground is hilly between the two rivers.

Of lateral communications along the whole length from Nasice to Ludbreg, there are only a railway line and a third-class road running along the north-eastern foothills of the Croatian and Slavonian mountains. In the eastern part there are a narrow-gauge railway line and the third-class highway from Slatina via Donji Miholjac to Osijek. There are several roads and railway lines leading towards the Drava, that is to the frontier: to Donji Miholjac (bridge demolished), to Bare (railway bridge adapted for vehicular traffic - partly demolished), Djurijevec - Ferdinandovac (highway), Virje - Zdala (highway), Koprivnica - Gyekenes (railway bridge) and Koprivnica - Legrad. The above mentioned bridges and the bridgehead Zdala - Gola connect the Podravina with the left bank of the Drava. Across the Croatian and Slavonian mountains it is connected with the Posavina by several railway lines and roads from Nasice, Suhopolje, Djurdjevac and Koprivnica.

Behind this subdivision extends an almost unbroken range of hills from Djakovo to Varazdin: Krandiža (elevation 602 m), Papuk (elevation 953 m), Bilo Gora (elevation 307 m), Kalnicko Gorje (elevation 643 m) and Ivancica (elevation 1061 m). This ridge is very important, for on the right bank of the Drava it is the first obstacle to a possible penetration towards the Posavina, protecting the Posavina with its lateral communications parallel to the front running from Zagreb to Belgrade, and also the political and economic centre of Croatia - Zagreb. This ridge is extending, more or less, parallel to the frontier line and can be organized as a defensive zone.

Conclusion: The Drava subdivision is very important, for it protects and blocks the gates from the Podravina to the Posavina, also our vital objects - Zagreb and our traffic line of greatest capacity Belgrade - Zagreb which, in relation to the Hungarian frontier, appears as a first-class lateral communication parallel to the front.

The left subdivision (the Mura subdivision) extends from the mouth of the Mura to the convergence.

The southeastern part of this subdivision to the mouth of the river Lendava runs along the Mura, lying in the plain of Prekomurje with the Drava immediately behind. The northwestern part extends along the eastern slopes of the ridge that drops down from the convergence (elevation 380 m) to village Kobilje. At a distance from 8 to 10 km behind the Mura lies a ridge formed by the eastern spurs of the Slovenska Gorice; it, too, can serve as a line of defensive positions for checking hostile penetration.

The Prekomurje is thinly wooded, economically strong, well populated, with many good communications and well passable.

The northwestern part of the frontier runs across hilly ground, average height of which is from 300 to 400 m. This hilly area dominates the terrain spreading east and northward from the frontier and can serve as the organization of positions to defend the Prekomurje Plain. The Prekomurje is our large bridgehead on the left bank of the Mura, wide about 50 km and about 30 km deep. Shortcomings of this bridgehead are: open flanks at Donja Lendava and Redgona, that is, weak support of the flanks by the Mura river. Behind this subdivision, along the line of the Slovenska Gorice and its eastern spurs, and in connection with the Mura, a zone of defence could be organized.

Conclusion: The importance of the Mura subdivision is the result of

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its flank position on the frontier line, of its leaning against Austria and because it blocks the lines of operations leading towards our important objects: Ptuj, Maribor and Celje, and via Varazdin and Zagreb.

CONCLUSIONS

ABOUT THE

HUNGARIAN FRONTIER

The right sector is wide open; with the exception of swampy areas along the rivers, it is passable everywhere for all branches of the army. Topographically, it is very weak, and the weakest is the central part of the Backa subdivision. The left sector is incomparably stronger (the Drava and the Mura and the Croatian-Slavonian Mountains and the mountains in northeastern Slovenia) and easy to defend.

THE AUSTRIAN FRONTIER

The length of the frontier is 323 kilometres. General direction of the extension: east-west. Starting from the convergence of the Yugoslav, Hungarian and Austrian frontier (elevation 380 m in the Prekomurje), the frontier line runs southwestward to the river Kucnica, then along this river to the river Mura, along the latter to village Radgona and further on to village St. Ilj where it leaves the Mura crossing the railway line and the first-class highway Maribor - Graz; immediately thereafter it runs across the western slopes of the Slovensko Gorice, ascending the ridge of the Kozjak mountain and along it westward to the Kosenjak mountain and its summit (elevation 1522 m); from here it bends southwestward and steeply drops to the Drava, crossing it about 4 km from Dravograd up the river. From the Drava, the frontier line runs across mountains of medium height and high mountains across the peak Pec (elevation 2126 m) and Glebovo (elevation 1929 m) to the Savinjski Alps 3 km east of the summit Karavanke ridge, the Kosut mountain (elevation 2134 m), the summit Stol (elevation 2236 m), the peak Kep (elevation 2143 m) to the peak Pec (elevation 1509 m); this peak is the convergence of The Yugoslav, Austrian and Italian frontier.

Almost along the whole length the frontier is natural, for it runs along the ridges of high mountains or along rivers, except from the source of the Kucnica to the Hungarian convergence.

From the ethnical point of view, the frontier line has not been traced satisfactorily, because about 100,000 Slovenians live in Austria, in Carinthia, and partly in Styria, while about 50,000 Croats live in Burgenland (eastern Styria).

The frontier line is slightly broken with only one large and sharp jut into our territory and one jut into Austrian territory. Important Austrian juts are:

- the Radgona wedge, a sharp wedge whose point is in the vicinity of the spa Slatina-Radenca;
- the Jezersko wedge, whose point is in the vicinity of the summit Grintavec (elevation 2558 m). Since the borders of this wedge in our territory are high mountains, this jut is insignificant.

From our territory toward Austria there is only one jut in the

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Prekomurje worth mentioning that reaches in the north of the convergence, only 6 km south of the river Rab.

The Radgona (Austrian) jut and the Prekomurje (our) jut are of tactical operational importance.

Gates:

- the valley on the left bank of the Mura, from Radgona toward Murska Sobota,

- the Mura valley at Spilj (Spielfeld),

- the Drava valley towards Dravograd,

- the valley of the river Meza - Gustanj - Fliberk.

All these openings are vulnerable places on the frontier and are very important from the tactical and operational point of view.

Considering the relief within the frontier zone, the frontier can be divided into two sectors: eastern and western.

THE EASTERN SECTOR. Extends from the convergence (elevation 380 m) to the peak Pec inclusively (elevation 2126 m), 20 km west of Dravograd. According to the relief, rivers and communications Maribor - St. Ilj - Stres, the sector is divided into three subdivisions: the Prekomurje subdivision, the Mura subdivision and the Drava subdivision.

The Prekomurje Subdivision extends from the convergence (elevation 380 m) southwestward across the hilly terrain to elevation 400 m; from here it runs southward along the river Kucnica to its mouth. The ground is wooded and broken, but passable. Communications run from north to south, parallel to the frontier. There is only one highway across the frontier: Radgona - Jenersdorf, and in the south two highways: Murska Sobota - Radkersburg. In the same direction, from the convergence southward, the spurs are sloping; they can serve as a number of successive tactical positions.

Our jut northward on the Prekomurje subdivision brings the frontier line to only 6 km from the river Rab. Important railway line and a highway, connecting Graz and Hungary, run along its valley. At the same time this subdivision lies on the flank of the Mura subdivision. Its weak point are the gates east of Radkersburg.

The Mura Subdivision extends from the mouth of the river Kucnica along the Mura to the point where the frontier line leaves the Mura (1.5 km southeast of Spilj). The Mura is about 150 m broad, with fast current and low banks. From Vratja Vas to St. Ilj, where the eastern spurs of the Slovenska Gorice reach the Mura, the right (Yugoslav) bank is higher than the left (Austrian). In Austrian territory the frontier zone along the Mura is wooded here and there, passable, with good communications, populated and cultivated. In our territory the hilly terrain of the Slovensko Gorice is broken, wooded, with many vineyards and orchards. The subdivision has good communication and is easily passable, and the plain south of village Apaca and around Gornje Radgona well cultivated and populated.

Important crossings (bridges on the Mura) are: second-class highway Murak (Omurek) - St. Lenart - Ptuj and the second-class highway Radkersburg - Gornje Radgona.

The Drava Subdivision extends from the point where the frontier line leaves the Mura to the peak Pec west of Dravograd. Leaving the Mura the frontier

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line leaves the Mura to the peak Pec west of Dravograd. Leaving the Mura the frontier line turns southward, crossing the railway line and the highway Maribor - Graz, running across the ridge of the Slovenske Gorice and drops down to the valley of the river Pesnica; from here it ascends the low ridge of the Kozjak and the Kosenjak, a mountain of medium height (elevation 1522 m), from where it falls steeply down into the valley of the Drava, crosses this river about 4 km northwest of Dravograd and then the railway line Dravograd - Gustanj - Celovec, running up to the peak Pec. The ground along the whole zone is very broken, densely forested, difficult to pass, with poor communications and thickly populated except in the area of the Slovenska Gorice which are full of vineyards.

From the frontier line towards our territory, towards the Drava, the terrain falls down steeply, leaving in the valley on the left bank of the river only a narrow flat zone along which runs the second-class highway from Maribor to Dravograd. These steep sides are unsuitable for settlements and therefore thinly populated. The way out from the Drava valley to the frontier line is difficult except from Marenberg to the saddle Radel with the third-class highway to Eibiswald (Austria). In the north, towards Austria, the terrain is sloping down and is therefore more populated, has better communications and is passable.

South of the Drava along its right bank extends the ridges of the Pohorje (Orni Vrh, elevation 1543 m) from Dravograd to Maribor. Its top is easy to pass, with very broken sides. It is of medium height, wooded and thinly populated, comparatively easy to pass on the top, but its slopes - northern and southern - are difficult to pass. Its northern slopes reach the Drava, leaving only a narrow passage for the railway line Maribor - Dravograd.

Between the Drava and the peak Pec the frontier line runs across the terrain of medium height, wooded and broken and difficult to pass. In Austrian territory the terrain drops steeply down into the Pliberk lowland area; in our territory it also falls steeply down into the valley of the river Meza.

The crossings and gaps worth mentioning on this subdivision are:

- Stras - St. Ilj - Maribor (railway and second-class highway),
- Ehrenhausen - Zgornja Kungota (second-class highway),
- Leutachach - Zgornja Kungota (second-class highway),
- Eibiswald - the saddle Radel - Marenberg (second-class highway),
- Wolfsberg - the valley of the river Labotnica - Dravograd (railway and second-class highway),
- Celovec (Klagenfurt) - Gustanj - Dravograd (railway and second-class highway).

On the flanks of this subdivision there are two natural gaps: the valleys of the Mura and the Drava.

Considering the relief of the subdivision, impassability and lack of communications in the central part, except the highway Eibiswald - Marenberg, the subdivision is not suitable for military operations except along the valley on its flanks.

Conclusion: The eastern sector is topographically weaker along the Prekomurje and the Mura subdivisions where the ground is hilly. The Mura is the biggest obstacle here. The terrain along the Drava subdivision is mainly low-mountainous, and partly of medium height (the Kosenjak). Behind this subdivision parallel to the frontier, flows the river Drava, and along its right bank extends the Pohorje, all of which makes this subdivision very strong. Behind the left

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flank of the subdivision extends the mountains of medium height (the Urslje Gora, elevation 1696 m and the Mozirske Planine Mountains, elevation 1695 m).

The eastern sector blocks all lines of operations leading from Austria to the Podravina and the Posavina - that is, to the Zagreb region by way of Varazdin, Maribor and Celje.

The following regions in our territory can serve as concentration areas: the Prekomurje (considerably advanced); the area between Celovec, Ormoz and Varazdin; the Ptuj Polje and the Drava Polje; the valleys of the Savinja and the Mislinja southeast of Sloven Gradec.

In Austrian territory: the valleys of the Rab and the Mura and the lowland areas south of Graz and around Leibnitz.

THE WESTERN SECTOR. It extends from the peak Pec at Dravograd at the western point of the Karavanke mountains. Considering the relief it can be divided into two subdivisions:

- the right subdivision, from the peak Pec to the saddle Jezerski Vrh exclusively;
- the left, from the saddle Jezerski Vrh inclusively to the convergence of the peak Pec.*

The right subdivision. Here from the frontier line runs, in the main, across the higher mountains of medium height and over individual high peaks (Pec, elevation 2126 m, Olsevo, elevation 1929 m) and over the Savinjski Alps. The ground is very broken, forested, with steep sides, deeply cut valleys and rocky in the Savinjski Alps.

The left subdivision extends along the Karavanke mountains: at the beginning the frontier line runs across the saddle Jezerski Vrh (elevation 1216 m) and then ascends the Kosut mountain (elevation 2134 m); from this mountain it runs down towards the saddle Ljubelj (elevation 1370 m) and then towards the peak Pec. The ridge of the Karavanke is high: from the saddle Ljubelj to the peak Pec its northern slopes drop steeply down to the valleys of the Drava and the Zilja, and also its southern slopes to the Sava valley. The Karavanke are difficult to pass; they can be passed by mountain units, and here and there by alpine units only. The Karavanke are densely forested and almost unpopulated; settlements appear along their southern and northern foothills. Here, in our territory, and in Austrian territory, too, are railways and highways.

Communications:

Velikovec - Zelezna Kapla - the saddle Jezerski Vrh to Kranj and the Sava valley (second-class highway);

Celovec - Borovlje - the saddle Ljubelj to Trzic and the Sava valley (second-class highway);

Beljak - Kranjska Gora - the source of the Sava Dolinka (second-class highway);

the railway line Celovec - Jesenice, running through an 8 km tunnel under the Karavanke.

* Note: the two above-mentioned peaks have different names: the first Pec, and the second Pec (Petz and Petch).

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Conclusion: This sector is topographically very strong, for the relief of the Karavanke makes it strong, and since the frontier line runs along the main ridge, there are no advantages for either of the two countries. In the southern part of this sector spread lowland areas and fields along which very good communications run towards the political centre of PR Slovenia - Ljubljana. Besides, our heavy industry (Jesenice) is in the valley of the Sava Dolinka, and somewhat southward big industrial centres (Kranj, Medvode, Ljubljana, Menges, Kamnik, Domzale, etc).

As concentration areas in our territory may serve: the Redovljica lowland area, extending southward to Kranj, then the Kranj Polje, the Sora Polje and the Ljubljana Polje. All these areas are densely populated, with a strong military-economic potential and have all the resources required for maintaining large units.

In Austrian territory, the lowland area between Fliberk and Dobrla Ves and the Drava river, the valleys around Celovec and Beljak can serve as concentration areas.

NOTE: The Austrian frontier is divided into two sectors considering its orographic and hydrographic features. However, observed in connection with operational and important lines of operations and objectives of these lines of operations (from the Prekomurje and Maribor to Zagreb; from the Dravograd area, village Mezica, village Solcave to Celje and Zidani Most; from the Karavanke area to Ljubljana) the frontier could be divided into three sectors:

- 1) The eastern (Maribor) sector from the convergence (Jugoslavia, Hungary, Austria) to the Kosenjak mountain (exclusively); this sector blocks all lines of operations leading from Austrian Styria to the Podravina and Zagreb area.
- 2) The central (Sostanj) sector from the Kosenjak mountain (inclusively) to the Savinjski Alps (the summit Grintavec - elevation 2558 m exclusively); this sector blocks all lines of operations leading from Austrian Eastern Carinthia (the areas: St. Andraz - Velikovec - Fliberk) between the Pohorje and the Savinjski Alps to Celje and Zidani Most areas.
- 3) The western (Gorenjsko) sector from the Savinjski Alps to the convergence (Jugoslavia, Austria, Italy). This sector blocks all lines of operations leading from the Celovec - Beljak lowland area to the upper Sava and Ljubljana area.

THE ITALIAN FRONTIER

The length of the frontier line is about 225 km. Italy is the largest country in our neighbourhood. We are separated from it by the Adriatic Sea in the main, and by land frontier.

The land frontier with Italy begins at the convergence of the Yugoslav, Austrian and Italian frontier. From here it runs straight southward, cuts the watershed at village Ratece and the first-class highway and the railway line from Jasenice along the Sava Dolinka valley to Italy in the valley of the river Ziljica or the Bela. Further on, it ascends high mountains, turns westward across the peak Mangrt (elevation 2670 m), then southwestward across the saddle Predel (elevation 1156) and the peak Kanin (elevation 2585) to village Uceja where it leaves high mountains. Here, along a big arch, it runs southeastward across the peak Matajur (elevation 1643 m) to the ridge Kolovrat where it approaches to 5 km from Tolmin, reaching the upper Idria. It runs along this

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river west of village Kozbane and then around the Brdo reaches the river Soca at Solkan about 3 km northeast of Gorica. Here it crosses to the left bank of the river Soca and across the plain southwestward to the river Vipava, leaving Gorica to Italy. At village Miren it crosses the Vipava, ascends the Döberdobska Planota and somewhat east of village Doberdob turns southeastward, enveloping Trieste from the east and then from the south and at village Lazaret reaches the Adriatic Coast.

From the ethnic, economic, geographic, topographic and military point of view the frontier line has been traced unjustly and unnaturally:

- compact areas populated by Slovenians have been ceded to Italy, Kanalske Dolina, Rezija, Beneska Slovenije, Trieste and the former zone A insofar as it was taken over by Italy;

- Gorica, the economic, traffic and cultural centre of a large area, of which the greater part is in Jugoslavia, has been cut off from this territory;

- the frontier line approaches to the valley of the river Soca to 2 or 3 km here and there, and at Solkano it crosses this river, remaining on its left bank, which all offers great operational advantages to Italy;

- PR of Slovenia is cut off from the Sea by an artificial zone whose width is about 3 km, so that a territory that for centuries has gravitated towards the sea and has lived off it, is cut off from it now.

The frontier is a broken line with large and sharp juts in both sides. The Italian juts worth mentioning are:

- the Trebis jut, reaching Ratece; its boundaries are: in the north, the Austrian frontier (the ridge of the Karnski Alps and partly the Karavanke), in the south - the line: the Mangrt (elevation 2678 m) - the saddle Predel,

- the Cedad jut whose point is on the ridge Kolovrat; its boundaries: in the north, the line from the Matajur (elevation 1643 m) to the ridge Kolovrat, and in the southeast the river Idria,

- the Gorica jut, whose point is north of village Solkan; its boundaries in the north: the southern foothill of the Brdo, and in the east, the line: Solkan - Opatje Selo,

- the Trieste jut, whose point is southeast of village Bazovica (towards the elevation 741 m - V. Gradisce) its boundaries are: in the north-east: the southwestern foothills of the Komenski Kras, and in the southeast and the south: the western spurs of the Cioarje: this jut reaches to 3-4 km from the highway and the railway line Divaca - Pazin - Pula.

From our territory westward the following areas are jutting:

- the Bovec-Kolarid jut, reaching in the west the line: the Kanin mountain (elevation 2585 m) - village Uceja - village Prosnid; in the northwest it is bordered by the line: the Mangrt - the Predel - the Kanin; in the south, by the line: village Prosnid - the peak Matajur - the ridge Kolovrat,

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- the Kojško jut, extending between the river Idria and the river Soca southward in the direction of Krmin, reaching to 3 km from the railway line Gorica - Videm,

- the Kras jut, pointed towards Trzic (Monfalcone) and the bay of the same name, reaching to 3-4 km from international communications leading from the west via Venice and Trzic to Trieste.

All above mentioned juts are very important from tactical and operational point of view.

Along the Italian frontier there are the following natural gates:

- the Bela valley - the river Ziljica - Ratece - the valley of the river Sava Dolinka,

- the valley of the river Nadiza - Kobarid (this gate, considering the narrow valley, can be called a defile),

- the valley of the river Soca from Solkan to Tolmin,

- the valley of the river Vipava whose boundaries are: in the north; the line, the Brda - Trnovski Gozd - Nanos, and in the south: the Kamenski Kras; the main communications from the Soca valley eastward to our country via Postojna to Ljubljana or via Ilirska Bistrica to Rijeka run along this zone.

All these gaps are vulnerable places on the frontier and may be of great tactical-operational importance, especially operational. It is necessary to stress that these openings, crossing to our territory, get narrow in the form of defiles which can be blocked and defended easily, except the valley of the river Vipava.

In general, the whole zone between the Julian Alps and the Adriatic Sea is a broad gap through which nations moved in history from the Pannonia Plain to the Apennine Peninsula.

Considering the relief within the frontier zone, the frontier can be divided into three sectors.

The Northern Sector (high mountains),

The Middle Sector (low mountains and mountains of medium height),

The Southern Sector (the Gorica Sector).

The Northern Sector (high mountains). Extends from the convergence to the valley of the river Učaja.

Only in the Ratece watershed the frontier line runs across the terrain easy to pass; in other parts the ground is rocky, bare, with sharp peaks and ridges and almost impossible to pass (alpine units only). Only the northernmost slopes of the ridge are wooded from where the Mangrt drops towards Ratece and the terrain below is 1500 m above sea level.

The frontier line runs, in the main, along ridges of mountains, giving no advantage to any of the two countries. From the river Učaja to the saddle Predel the terrain drops steeply down to the river Soca and Koritnica so that tactical positions in our territory have not the depth required. In this part westward (towards the rivers Tagliamento and Bele) the terrain drops gradually, offering to the opposite side a sufficient depth for the organization of a number of support positions.

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Main communications running across this sector to Italy are:

Jesenice - Kranjska Gora - Ratece - Bela Pec - Trbiz - the Kanalska Dolina - Ponteba - (first-class highway and railway line),

Bovec - village Log (in the valley of the river Koritnica - the saddle Predel - Lake Rabelj - village Rabelj (in the valley of the river Ziljica - Trbiz (second-class highway),

Along the left (southern) border of the northern sector runs from village Zag (in the Soca valley) a third-class highway along the Učaja valley to Trecent and Udine.

The northern (high mountains) sector includes the central massif of the Julian Alps which are composed of limestone and dolomite. Individual peaks are separated by deep and steep valleys. The ridges are teeth-like, sharp, with sharp peaks covered with snow. In middle parts, below 1500 m above sea level, mountains are overgrown with evergreen trees; above them alpine pastures can be found. Due to this characteristic visibility is poor.

THE MIDDLE SECTOR (mountains of medium height or low mountains). - Extends from the valley of the river Učaja to the Soca at Solkan. Considering the relief, we have two subdivisions here: mountains of medium height and low mountains,

The subdivision of mountains of medium height extends from the Učaja to the area of the source of the river Idria.

Communications worth mentioning are: Kobarid - Targent (second-class highway); Kobarid - Cedan (first-class highway along the valley of the river Nediza); Kobarid - Cedad (a road for vehicular traffic via village Livek).

The frontier line runs along the ridges of mountains over the dominating peaks, giving no advantage to either of the two countries, except on the Kolovrat, where the summit - elevation 1243 m - is in our territory. Along the upper Nedize, our bank (the Kobarid Sto - elevation 1668 m) considerably overtops the Italian bank. On the ridge west of Kobarid none of the two sides are in a better or worse position. On both sides the terrain is well grown with trees, so that visibility is equally poor.

The subdivision of low mountains extends from the upper Idria to the Solkan bridge on the river Soca.

The valley of the river Idria, up to its exit from the mountain west of village Kozban, is deeply cut between two ridges of low mountains extending from the Kolovrat mountain southwestward. The valley is very narrow, banks very steep, rocky here and there, over 300 metres high, fairly wooded. The river Idria is fordable in summer. Along each of the banks there is a third-class road; along the upper part of the river they continue as horse paths. The ridge on our side is higher and extends between the Soca and the Idria, and on the Italian side it is lower and extends between the Idria and the Nadiza; both ridges are wooded so that visibility is considerably restricted. There are no tactical advantages, while Italy has operational advantages because of the small distance between the frontier and the Soca.

From village Kozbane to Solkan our side is higher than the Italian; nevertheless, visibility is quite restricted due to dense population, partial woodiness and many orchards and vineyards. The unfavourable circumstances is that the frontier reaches to the slope northwest of Solkan, which directly dominates the entrance of the mountainous part of the Soca valley.

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Main communications are: Kojško - Gorica (second-class highway); Smartno - Mosa (second-class highway); village Kozbana - Oeđad and Kozbana - Videm (second-class highway); village Idria - Oeđad (second-class and third-class highway).

THE SOUTHERN SECTOR (the Gorica Sector). Extends from Solkan to village Lazaret which is at the Adriatic Coast. Considering the variety of the relief, configuration of ground and the relation to the Adriatic, this sector is divided into three subdivisions: the Gorica subdivision, the Kras subdivision and the Istria subdivision.

The Gorica subdivision extends from Solkan to the river Vipava. The frontier line runs across the fertile, densely populated plain and along the eastern border of the town of Gorica, along the railway line Solkan - Gorica, so that the railway line and the railroad station are in our possession. The ground is easy to pass everywhere.

Main communications are: Ajdovscina - Nova Gorica - Gorica - Videm (first-class highway and the railway line); Trieste - Dornberg - Gorica (railway line and second-class highway); Solkan - Gorica (the railway line Jesenice - Gorica).

The Kras (Doberdob) subdivision extends from the river Vipava to village Jamlje. This subdivision includes the northwestern spurs of the Komenski Kras, which is, in average, a plateau from 300 to 400 metres high with a few ridges extending parallel from southeast to northwest. On the frontier line the average height above sea level is about 200 metres. The ground is of limestone, with many funnel-shaped holes in the limestone formation and caves, predominantly bare, covered with bushes and small woods in some places, difficult to pass off the roads, good communications.

The Istrian subdivision extends from village Jamlje to village Lazaret. To elevation 741 m (V. Gradisce) it runs along the ridge almost parallel to the seaside separating the narrow, artificial zone of the former A Zone from its natural hinterland. From elevation 741 it runs along the western spurs of the Gicarije and in the form of an arch envelops the town of Trieste and the Milje Bay from the east and from the south. The ground is of limestone, with a number of potholes, difficult to pass, but with a lot of good communications. The terrain is bare and open. The frontier line is jutting into our territory with the point towards elevation 741; this jut is about 5 km deep and its base is about 8 km long, so that it may be of great importance (vulnerability to our communications Divaca - Pula, etc.).

All main communications connecting Trieste with its natural hinterland across our country run along this subdivision: Trieste - Rijeka, Trieste - Ljubljana, Trieste - Gorica, Trieste - Pula. The frontier line runs around the former A Zone (now ceded to Italy), which offers us all tactical and operational advantages. Its weak point is about village Bazovica and the north-westernmost part. Along this subdivision the frontier line has been traced only 3-6 km from the sea, so that an artificial zone was created here by which FR Slovenia has been cut off from the sea.

Water is available from cisterns and well spread waterworks; besides, there are several strong watersprings and Lake Doberdob in Italy.

The main communications in this subdivision are: Komen - Trzin and Komen - Opatje Selc - Gorica (highways); besides, there are a number of good roads for vehicular traffic.

THE SOUTHERN SECTOR (the Gorica Sector) is a strong bridgehead for Italy on the left bank of the river Soča with two strongholds: the Doberdobska Planota in the southern, Kras subdivision and the town of Gorica in the northern,

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Gorica subdivision.

CONCLUSION. Taken as a whole, the Italian frontier is favourable traced for FFRY as to the relief, for in our territory, in hinterland, the terrain ascends to a considerable depth and on the left bank of the Soča continues into mountains difficult to pass, of limestone, waterless and thinly populated (the Trnovski Gozd, and somewhat northward the highest peaks of the Triglav massif), while in Italian territory it drops to the great Friulian Plain through which the way is open to Venetian Plain and Lombardy. In our territory, the unfavourable circumstance is that the frontier line extends from Gorica to northeast of Bovec at a small distance (from 4 to 8 km) from the river Soča along whose valley our important communications run (the highway Nova Gorica - Kranjska Gore and the railway line Nova Gorica - Jesenice).

RELIEF

Jugoslavia is predominantly a country of mountains of medium height, low mountains and hills. Her total surface is:

... below 200 metres above sea level	30%
... above 200 metres above sea level	70%, viz:
from 200 to 500 metres	25%
from 500 to 1,000 metres	27.5%
from 1,000 to 1,500 metres	14%
from 1,500 to 2,000 metres	3%
over 2,000 metres	0.5%

As evident, the main representative of our highlands is the zone between 200 to 1,000 metres with 52.5%. Of the total surface, 82.5% is under 1,000 metres, which is, considering weather conditions, suitable for agriculture.

The highest peaks are usually on the frontier or in the vicinity of it. In the north: Kopa (trig. 2143), V. Stol (trig. 2236), Kosuta (elevation 2134 m), Grintavec (trig. 2558), Pec (trig. 2126); in the northwest: Triglav (trig. 2863) with Skrlatica (elevation 2738 m), Mangrt (trig. 2678), Kanin (elevation 2585 m); in the southwest: Prokletije (trig. 2656), Vrace Planina (trig 2582), Rudoka Planina (trig. 2662), Titov Vrh (Turcin) (trig. 2702), Koritnik (trig. 2394), Korab (elevation 2764), Desat (trig. 2375), Jablanica (trig. 2259); in the south: Galleia (elevation 2088 m), Pažister (trig 2600), Nidze (trig. 2251); in the east: Midzor (trig. 2169), Osogovske Planina (trig. 2252). On the other hand, in the north, 5/6 of the total lowlands of Jugoslavia are concentrated around five big rivers (the Danube, the Drava, the Sava, the Tisa, the Morava). The rest are isolated lowland areas around towns and narrow river valleys in mountainous regions and the low terrain along the Adriatic Coast.

Looking at the physical map of our country, we see that the zone of highlands lies immediately along the Adriatic Coast spreading from there deeply in hinterland. Such relief has naturally separated the Adriatic Littoral and islands from the rest of the country and made the construction of communications difficult. At the same time, this relief has for centuries protected the central part of the country from invasions from the sea, as well as the coast from Turkish invasions from inland.

The influence of the relief of our country is great and various. First of all, it influences the climate: this influence is getting greater in connection with the extension of our country from the north to the south (667 km). According to its latitude, Jugoslavia should actually have Mediterranean climate,

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approximately as Italy and Southern France. But, separated from the Adriatic and Aegean Sea by high mountains, it is exposed to north and northeastern climate.

The relief also influences rivers. In mountainous regions their current is fast, in the plains - slow. Hence, our rivers are navigable in the Pannonia Plain, and largest reserves of water power are in mountainous regions. Network of communications is dense in lowlands, and also industrial installations.

The relief influences the life, activities and combat actions of military units, especially their mobility (transportation), manoeuvrability and crossing obstacles.

According to the relief, climate, geological structure, geographical position and the economic importance, Yugoslavia can be divided into six natural entities:

- Adriatic Littoral with islands;
- Carso;
- High mountains;
- The Pannonia Plain;
- The region of Pannonian valleys;
- The region of Aegean valleys.

Each of these regions has its own characteristics, and conditions of life are different in each of them.

Adriatic Littoral with Islands

The Adriatic littoral region embraces the coast with islands and lowland in hinterland under the influence of Mediterranean climate. Although restricted to a narrow zone between the Adriatic Sea and mountains along the coast, the Adriatic littoral with islands, by its characteristics, dissection of coast and strong influence of the Mediterranean, is a separate natural and economic whole in our country.

The littoral is of various width. It is the narrowest at the Quarnero Gulf, under the Velabir and the Biokovo and in Boka Kotorska. Wider zones are in the Western part of Istria, in North Dalmatia, in the lowland of Hercegovina along the river Neretva and in the south along the Bojana river. In the far northwest the Slovenia Littoral is extending inland reaching the Brda and Gorica; eastward it is continued as the Vipava valley.

The coast is of limestone, bare and waterless.

The Littoral includes many islands that are extending in rows parallel to the coast; they are parts of the mainland and if the surface of the Adriatic Sea got down for 90 metres, all our islands would get connected with the mainland again.

By far and most the Adriatic influences the climate of this region. In the main, there are two seasons - summer, lasting from four to five months, with draughts and a shoreward wind (from 10 a.m. to 6 p.m.) called "maistral"; winter - damp and cool season, lasting from seven to eight months. "Jugo" blows then, a south wind from the Mediterranean, bringing rain. After "jugo" usually blows "bura", a stormy, cold and dry wind, clearing up the sky and lowering the temperature.

The following factors influence the economy of the Adriatic littoral: the sea - whose economic importance is great (fishing, navigation, salt, tourists, etc.), climate - evergreen flora, fruit and, finally, relief and geologic structure of soil.

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Karst (or Carso)

Karst region includes deep hinterland of our littoral extending north-eastward, eastward and southward to the line: Idria - south border of Ljubljansko Barje - the Krka river to Novo Mesto - Metlika - Karlovac - Bihac - Sanski Most - Banjaluka - the Vlasic mountain - the Kupres Polje - Prozor - Jablanica - Sarajevo - Poca - Gajnice - Pljevlje - Mojkovac - Andrijevica - Tuzi - the Rumijska mountain.

In Macedonia, there are karst areas in the Karadzica mountain, in the Suva Gora mountain (between the Vardar and the Treska), in the Bistra mountain (southwest of Metkovo) and in the western part of the Galicija mountain (from Ohrid to Albania).

In Bosnia the karst area is Cevljanovici - Olovo - Vlasenica to the Drina river and Visegrad.

In Serbia, karst areas are: around Novo Varos and Sjenica, around Valjevo and the Cer mountain, then in the area of the Homoljska Planine mountains: the Kucaj, the Veliki Strbac, the Rtanj, the Ozren, the Devica, the Svrlijska Planine mountains, the Tresibaba, the Vidlic, the Suva Planina and the Vlasica Planina mountains.

a) General Information About

Karst Terrain

The karst region is the most characteristic representative of the Dinara mountains, although karst can be found in other mountain systems.

The karst region is the most rugged and the most unpleasant in Europe. Its basic characteristic is the result of the geological structure of soil, configuration of ground and climate. Karst is porous limestone. Thanks to this circumstance, and to a great extent to merciless and unplanned destruction of forests, the result was the elimination of cover of woods at first, then denudation of ground and, finally, the shortage of water and fertile land, ruggedness and bleakness of limestone formation and severe winds, which made karst regions desolated and poor.

Individual karst regions consist of limestone highlands sloping seaward in the form of terraces. Karst ridges and rocky sides of terraces and individual highland areas are obstacles difficult to pass.

Valleys look as if they have not a complete form; as if composed of the parts of individual valleys aligned one after another ending in rock as a blind alley.

Communications generally run across karst fields or along their borders. These fields are suitable for airfields and for the stationing of troops. These fields are often flooded and in this case are obstacles to the enemy's movement. The terrain around these fields or between them can be easily defended.

On the other hand, some fields that are naturally flooded from time to time (generally in the spring or in the autumn), making difficult the operations of one's own troops, may be cleared up of water by artificial tunnels and canals.

The karst terrain is full of caves, often of enormous dimensions. Many of them can be used for various purposes: for the quartering of men and animals, as shelters, workshops, stores, medical installations, underground fortresses, dwellings for the population (air raid shelters), water sources, cemetery, garage, etc.

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Caves should be searched in advance, because after heavy rains they may fill up with water and be completely flooded. There is also the danger of ceilings and walls falling down, especially during bombing.

The karst is very porous. It is marked by sinks or karst holes, interspersed with abrupt ridges and irregular protuberant rocks, and by caverns and underground streams. Rivers disappear into subterranean passages of the karst formation. There is little water on the surface. The lack of water is not the result of insufficient rainfall, but of its disappearance from the surface and sink. Due to such hydrographic features, large karst areas are waterless terrain where sources and springs are tens of kilometres far from villages. Waters in the karst can be easily contaminated, especially if a part of the karst terrain is in the enemy's territory.

Considering the difficulties in water supply, it is necessary to make hydrographic maps in peacetime showing surface and subterranean streams, their capacity and their route during the period of droughts.

The relief and the structure of soil are very important from the military point of view, for passability and communicability depend on them.

The karst relief is impassable for vehicles off of roads, and for horses and men off of paths due to many potholes, funnel-like hollows, gaps, abysses and other morphologic features. Movement is difficult by night even along known paths. This is important because of air raids.

In the wooded karst, especially covered with dense evergreen forests or scrub-covered country ("makija")*, military units are confined to roads. The terrain is to be cleared for the construction of fire positions with much explosives and many personnel engaged.

Due to the above mentioned characteristics, highways (a few) are very important for movement, manoeuvring, bringing up of supplies and evacuation. They are highly vulnerable, therefore, and endangered by bombing; demolition of roads would have worse consequences than in other terrain. Canyons, sheer rocks, defiles and narrow passages are especially vulnerable places.

According to the degree of woodiness, we have: strong karst, bare karst, thinly covered karst and covered, i.e., wooded karst. Strong karst is without any plants. Bare karst is covered with pastures, more or less stony, and with bushes here and there. Thinly covered karst is partly covered with bushes, small woods, most often virgin forests. Wooded, i.e. covered karst, is forested or covered with bushes; often it is covered with forests, sometimes a primeval forest. One should bear in mind that parts presented on maps as woodland in reality can be high and dense forests, or virgin forests, or bushes.

According to the relation between the stone and the earth, we have: biting karst, strong karst and moderate karst.

Biting karst is stony and rocky terrain of limestone. Difficult to pass even on foot. It can be found in high mountains and higher mountains of medium height of the Dinaric system, in southeastern Herzegovina, south Dalmatia, southwestern and southern Montenegro and in northern Albania. It can also be found around Rijeka, along the Croatian and Dalmatian littoral.

* "Makija" is typical Mediterranean bush; it is dense and interwoven with thorny scrub. The ground covered with "makija" is very difficult to pass, even for infantry. Paths are to be cleared with machetes. It is advisable to unload personnel of everything that is not necessary during the movement through "makija".

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Strong karst is where a stony surface is predominant. Infantry can move across it without using hands: impassable for horses. It includes the rest of Herzegovina and Montenegro and the central plateau of West Bosnia.

The rest of the karst region is moderate karst, i.e. where the surface is equally covered with limestone and earth. Horses can move easily. Moderate karst is predominant in other karst regions of our country and in general in the Balkan Peninsula.

Theoretically, biting and bare karst can be found along the Adriatic Coast, and covered, i.e. wooded karst further on inland. There are large forests in the area of Slovenian Karst (Notranjsko) and Rijeka Karst (Gorski Kotar), in Croatian highlands (the Velika Kapela, the Mala Kapela and the Pljesivica) and in the mountains of West Bosnia.

b) The Influence of Karst on

Organization, Equipment and Operations

In the large, compact regions of karst, whose borders were mentioned above, individual military and geographical elements express a great and characteristic influence on the life, activities, movements and combat actions of all branches of the army. This is the result of specific orographic, hydrographic, climatic, economic and traffic circumstances in this area, which impose certain measures during combat actions and operations different from those we generally apply in ordinary mountainous terrain.

Communicability. The karst region is the poorest in view of communications in general, and regarding good communications (highways and railways) in particular. The Slovenian karst and the Istrian karst are exceptions. After World War II, in the era of building up of socialism, the karst regions change, too. A number of highways and railway lines are under construction: they will run across karst regions, connecting all parts of our country with the Adriatic Sea.

The existing highways have a solid surface, but due to the relief, some of them are often steep and narrow (about 4 metres). Secondary roads are usable for light vehicles, because they are steep, stony and narrow. The pack horse is very useful here.

In winter roads are covered with snow drifts and traffic is suspended. Paths and secondary roads disappear under snow and ice out of use for several weeks.

Quartering is poor due to thin population, scattered localities and small capacity of houses in mountains. Circumstances within the zone along the Coast are better. There are few hostels in the mountains, but several are under construction.

Supply Service. The population are dealing with cattle breeding, a little with agriculture, then forestry, on lakes and the sea - fishing. Due to an intense industrialization of the country every year more and more people ask for employment in new industrial and mining enterprises.

The greater part of the karst region is short of firewood, and also of water in the summer time. The population use rainfalls as drinkable water from cisterns.

Due to thin population and lack of fertility of the soil, military units cannot reckon with local procurement; every operation must be prepared in advance

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and the bringing up of supplies organized well.

Climate. Comparatively great differences in height cause great difference in the beginning and lasting of individual seasons, and also the difference between winter and summer temperatures. In the main, there are two temperate zones very different from each other: the low, coastal zone of mild, modified Mediterranean climate and mountain zone with continental climate. The temperature in the coastal zone in winter time corresponds to a sunny spring day, while the adjacent mountain zone, not more than about three hours climbing, is covered with snow and ice. Troops must take this into account.

Winters are mild in low, coastal zones and in low winter valleys. Winter is short and almost without snow. Only "bura" lowers the temperature below zero. Spring begins in the second half of February or at the beginning of March; it is very short and rainy. Summer temperature appears in April; summer lasts about five months; it is very hot, sky is cloudless and from the end of June to September almost without rainfall. Fine weather lasts almost continually till the end of September, when a longer rainy period begins: in the north earlier, in the south later.

There is a continental climate in the mountainous regions. Severe winter lasts from three to six months, which depends on the altitude above sea level; it is very cold with deep snow that begins to melt in high regions (about 1600 metres) not before April or May. Snow storms, lasting several days, often suspend the traffic. Spring is short. In low regions summer is very hot and dry; in the mountains it is warm during the day only for a few hours, while nights are chilly. In mountains rainfalls are abundant in autumn and in spring. In summer there are no rainfalls and water. In autumn and in spring mornings are misty.

Strong winds blow in both temperate zones in winter - from October to the end of March; southeast - "jugo" ("sirko") and northeast - "bura"; they sometimes blow immediately and suddenly one after another.

Organization and Equipment. The length of march columns on bad secondary roads is four to six times greater than on the roads of this class in the plain. The circumstances, as well as tactical, supply and march requirements (departure, arrival, march discipline) force the division of large units into columns each of which ought to be tactically and operationally as independent as possible (composed of all branches of the army able to operate in a given area and to supply itself directly).

Special equipment is required due to sudden changes of temperature and great differences between day and night temperatures. The population of karst regions wear warm clothes during the whole year, so that the same is recommendable for the troops operating here.

Tents are an important part of military equipment, and in case of a longer bivouac - blankets. Boots are also important. Ordinary boots are not resistant to sharp limestone. Strapped boat-shaped, soft-soled footwear worn by the population of karst regions are suitable. Canteens, sometimes two, are indispensable. For the protection from sun stroke, it is recommended to put scarves under the cap in order to cover the nape of the neck.

The influence of karst on movement, accommodation, supply and combat action is similar to the influence of high mountains. Orientation is often difficult due to monotonous landscape; visibility, observation and fire are restricted due to broken ground; karst is almost impassable, especially for tanks and vehicles; construction of communications is possible only with great efforts; digging is often impossible and engineering work (trenches, shelters, etc) difficult. Shortage of water makes combat actions and operations difficult. In summer time march should begin early; karst valleys, lowlands and large potholes are not to be crossed after 10 o'clock in the morning because of sun stroke.

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Reserves of water in cisterns, wells, springs, rivers and streams are decisive factors in connection with the location of a bivouac.

The Region of High Mountains

This region may be divided into three groups: the Alpine, the Dinara and the Sar-Pelister group. The first group includes the spurs of the Alps around the source of the river Sava and its tributaries (the Julian Alps, the Savinjski Alps and the Karavanke). The second group includes mountains in the southeastern part of the Dinara system, within the area: Sarajevo - Mostar - Titograd - Pec - the upper Ibar. The third group includes high mountains in the south and southwest, along the right bank of the Vardar from the Sar Planina mountain to the Greek frontier.

The relief characteristics of the mountains of the first and second group are rivers deeply cut in rocks - in the Alpine group the Sava Dolinka, the Sava Bohinjka and the Savinja with their small tributaries; in the Dinara group the Lim, the Piva, the Tara, the Neretva and the Moraca, narrow and high ridges, steep slopes, narrow and often very deep valleys, very difficult to pass, thin population, poor and insufficient communicability, poor visibility, hard life; in the Sar-Pelister group high mountains are surrounded by hollows of former and present lakes.

Weather conditions are characterized by low winter and summer temperatures; in average, in winter from 10° to 12° below zero, and in summer from plus 4° to plus 8° centigrade; high mountains about in rainfalls.

In view of economy cattle breeding and forestry are worth mentioning.

The influence of our high mountains on combat actions, activities of individual branches of the army and organization and formation of troops to operate in high mountains is great. It is stronger in so far as high mountains are covered with karst. Due to difficult construction of communications high mountains are short of them, and out of roads are difficult to pass due to sharp differences between high and lowlands. Gradients are steep and difficult for motor and horse-drawn vehicles. In high mountains weather conditions are severe and life is hard, while lowland areas are of restricted economic capabilities and insignificant, for villages are scattered or do not exist at all. Only special formations - alpine units - are able to cope with difficulties in high mountains.

Pannonia

This lowland area includes the plain of the Vojvodina and extends beyond the frontiers to Hungary and Rumania. Climate is continental, with about 609 mm of rainfalls in average per year. The average temperature is 11° centigrade.

This plain is the granary of our country. All branches of agriculture and agricultural industry are highly developed. Pannonia is poor with coal, ores and water power. It is a woodless plain.

A moderate steppe zone, our Vojvodina is characterized by specific climatic and pedologic features that influence activities of the army.

It is characteristic for this region that heaviest rainfalls are in the first half of summer (29-33% of total yearly rainfalls). In spring rainfalls are a little greater (25-28%) than in autumn (24-26%), while winter is the driest season with only 16-17% of total rainfalls. The first maximum of rainfalls is in June, and the second in October.

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Dry months are July, August and September, and especially the period from January to April.

The surface layer of the soil is mould formed on the ground of humus. This layer is not thicker than 2 metres (1 metre in average).

The problem of woods in the Pannonia Plain today is the problem of underground water; when the water system of land is favourable, i.e. when the roots of forest trees reach underground water and when the soil does not contain alkaline salts, woods can grow in sand and in humus. But in spite of that, steppe characteristics of climate in this plain negatively influence the forestation of this region.

In the Vojvodina there are small surface areas that we generally call "salt-springs". They are formed where the level of the underground salt water is high (whatever the reason) so that salt water appears on the surface. They can be found in Banat, Srem and Backa. This salt surface is quite difficult to cultivate. The problem of water supply appears here, especially with large units, for underground water available in wells might be undrinkable due to alkaline and other salts.

Dunes can often be found in Vojvodina, especially northwest of Deliblato (Deliblatska Pescara). This terrain is an obstacle for the army, because the stability of the ground is equal to zero where there are no trees; the sand is constantly moving. This terrain is very porous. Under the ground, good, drinkable water can be found. Dunes are ridges of sand piled up by the wind.

The Deliblato Sands region is about 60 km long and about 30 km wide at the widest place. In dry weather the sand is granulated (if not bound by vegetation) so that it is an obstacle for the movement of trains, motorized units and tanks. Sand penetrates into engines and stops operating. In wet weather the sand is compact and quiet to a certain extent, but the mash-like sand makes difficult and slows down the turning of wheels.

The influence of the soil of Pannonia on the activities and combat actions of the army is significant. It will be discussed therefore in detail, although it lies outside our country by its greater part. Camouflage of engineering objects, positions, movements and actions of any kind is difficult, especially from enemy air observation, so that surprise is difficult to achieve; this refers to autumn, winter and spring when there are no crops. Hillocks and insignificant hollows are very important here; stone and wood for construction are very short in this region. There are no orographic obstacles to check movements and manoeuvring of any branch of the army in any direction, but, on the other hand, there are several water obstacles of tactical, operational, and even strategic importance (the Danube, the Tisa, the Drava, the Sava). These rivers are big obstacles, especially because of swampy zones along their banks that sometimes may be very wide (5, 10 km and even more than that). In spring and in the autumn, when the soil is soaked, cross-country movement is difficult even for infantry, and for other arms it is impossible in low-lying terrain.

According to its geographic position in Middle Europe, its relation to neighbouring regions and communications with them, Pannonia is a very important area from the economic, traffic, strategic, operational and tactical point of view. According to its size, passability, communicability, fertility, agricultural wealth and dense population it has a large operational capacity and may serve as a first-class concentration area for large operational units. Pannonia, as a whole, is naturally protected from all sides, partly by mountains, partly by broad rivers; however, military and political, it is unprotected, for all the mountains surrounding the lowland and gateways from those mountains to the lowland are in the territory of neighbouring countries which, in this way, dominate it. In the south the rivers Danube, Drava and Sava are partly or entirely in our territory.

Continental (European) and intercontinental communications run across the

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Pannonia Plain: from Western Europe via Vienna and Budapest to the Black Sea (Odessa and Constantine): from North Germany and Poland via Prague and Cracow, Budapest and Belgrade to Athens or Istanbul, where they extend to Mediterranean sea routes and land communications of Asia Minor. There are good communications with the Adriatic Sea via Zagreb to Rijeka and via Ljubljana to Trieste and further on to the Venetian Plain and Lombardy. The Danube is of great military, economic and political importance, for it connects Middle Europe with the western part of the Black Sea and with the Balkan Peninsula.

Pannonia has always been important. The Romans occupied its southern and western parts at the beginning of our era in order to protect the northeastern frontier of their empire. In the sixth century of our era the Huns invaded it, making it a base for their plundering raids in all directions, especially to the Byzantine empire and Italy. Towards the end of the IXth century Pannonia was the prey of Hungarians and served to them as a base for raids on France, Germany, Italy and the Balkan Peninsula. In the XVI and XVIIth century the Turks held possession of about three-quarters of Pannonia and from there they attacked Middle Europe (the siege of Vienna 1529 and 1683). In World War I (1914 and 1915) in the southern part of this plain (Vojvodina) strong Austro-Hungarian and German forces were concentrated for the offensive against Serbia. In World War II, Pannonia was Hitler's jump-off position for the invasion of Rumania, Bulgaria, Jugoslavia and Greece.

The Region of Pannonian Valleys

In fact, this region includes the border of the former Pannonian Sea, extending along the middle and lower Drava with the Mura and the Sava with the Krka and the Kupe, then along the lower Una, the Vrbas, the Bosna river, the Drina and almost along the whole length of the Kolubara, the Velika Morava with the Zapadna Morava and the Juzna Morava and the Mlava.

Climate is continental with slight indications of Mediterranean climate in the western part and the influence of Aegean climate in the Velika Morava river system. The upper parts of the above mentioned rivers are abundant in rain-falls (over 1,000 mm), while in their lower parts the quantity of rainfalls is smaller but somewhat better than in the Pannonia Plain.

In view of the economy, they have many characteristics of the Pannonian Lowlands as far as agriculture is concerned, but the valleys are rich with ores, woods and sources of energy, so that mining and industry are developed here.

The influence of this region on combat actions is considerably different than that of the Pannonia Plain. Small woods, forests here and there, large orchards, bush and groups of trees offer shelters from air observation. The ground is hilly, and on the sides of valleys there are good positions and observation posts; material for the construction of various objects is available here, which makes possible the construction of good highways in connection with hard surface of the ground. Passability is good and less depends on weather conditions.

The Region of Aegean Valleys

The backbone of this region is the valley of the middle and the lower Vardar with lower parts of its tributaries the Treska, the Lepenac, the Poinja, the Bregalnica and the Crna Reka. The valley of the river Strumica is included in this region.

Main characteristics of the relief of Aegean valleys are many funnel-like lowlands and defiles, so that every river valley is composed of a number of hollows and defiles extending one after another alternately. In the Vardar valley from its source toward the mouth of the following hollows and defiles take their

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turn each after the other: Polog (at Tetovo) - Dervenska defile, the Skoplje lowland area - the Taor defile, the Veles lowland area - the Veles defile (at Titov Veles), Tikves (from the mouth of the Bregalnica to Demir Kapija) - the Demir Kapija defile and the Gevgelika lowland area - the Giganska defile (Gipsy defile). In the valley of the Velika Reka is the Kicevo hollow, and in the valleys of the Mala Reka and the Golama Reka is Perec; in the valley of the Orna Reka the Bitolj-Prilep lowland area and Maricovo; in the valley of the Bregalnica are Malesevo (Berovo), Pijaneec (Delcevo) and the Kocane lowland area, in the valley of the Strumica - the Strumica lowland area. Lake Prespa and Lake Ohrid are also hollows full of water - lakes.

The climate of the Vardar valley is under the influence of the Aegean Sea (in January plus 1° to plus 4° centigrade); rainfalls about 450 mm - little.

This is a subtropical region where poppies, cotton, tobacco, rice and other industrial plants are cultivated. Cattle breeding is developed in mountains on many pastures; in the lake regions fishing is developed, and the eastern and northeastern parts are rich in ores.

Subtropic climate and very little amount of rainfall during the summer, when many springs and streams get dry, influence activities and combat actions of the army. Besides, some regions are bare and easy to observe from the air. Timber is not available. Karst appears in mountains: the Karadzica, the Suva Gora and the Bistria Planina. Coldness is severe in mountainous regions in winter time; in the valleys winter is moderate.

Considering the time and formation of our mountains, they may be classified into three zones:

- a) western zone of more recently formed mountains, extending from the Alps across the southwestern part of our country to Albania and Greece;
- b) the central zone of mountains and hollows of old, in the main, the Rhodope massif;
- c) eastern zone of more recently formed mountains, extending from the Carpathian Mountains across the Eastern Serbia, and in the form of an arch, to the Balkan mountain in Bulgaria; in the outer eastern part of this zone is the border of the Vlaska lowland area.

By the structure and direction of extension these zones are different; they are composed of various mountain groups. We have six mountain systems in our country:

- the Alpine system) belong to the western zone of more recently formed mountains
- the Dinara system)
- the Sar-Pindus system)
- the Carpathian system) belong to the eastern zone of more recently formed mountains
- the Balkan system)
- the Rhodope system) belongs to the central zone of old mountains.

I. WESTERN ZONE OF MORE RECENTLY FORMED MOUNTAINS

This zone is the largest and morphologically the most separated whole in our country. It covers almost a half of the territory of our country (over 40%) spreading between the Adriatic Littoral, the central (Rhodope) massif and vast Pannonian Plain with its border in the north. We have three mountain systems in this zone: the Alps in northwest, the Dinara in the middle and the Sar-Pindus in the southwest.

1. The Alpine System

The mountains of this system extend from the north across the Austrian tier and from the west across the Italian frontier, covering the northwestern part of our country. Their southern border is the river Idrija - the south border of the Ljubljansko Polje - the upper Krka - Metlika - Karlovac - Zagreb - Varazdin. The system also includes mountains extending between the Sava, the Drava and the Danube to the mouth of the Sava river, known as the Croatian-Slavonian mountains.

The Alps, the greatest part of which is out of our country, are divided into three zones: southern zone: the Southern Alps (limestone), central zone: Primeval Alps and the northern zone: the Northern Alps (limestone). Our country is in possession of southeastern spurs of the Southern Alps and Primeval Alps, separated by the Drava, except the Pohorje which, although on the right bank of Drava, belong to the Primeval Alps.

The Alps are predominantly composed of limestone and dolomite; mountains interspersed with abrupt ridges and irregular protuberant rocks, sometimes over 1,000 metres high, steep and narrow valleys. Their influence on the activities, quartering, movement and combat action of military units is very strong. Units are confined to roads, except alpine units. The construction of good communications is difficult, and therefore they are few and far between. Climate: severe - alpine, with a large amount of rainfall and long-lasting snow. The region of the Alps is thinly populated in the lower parts; in the upper parts population is thinner and thinner. Slopes fall down to basins and hollows of small dimensions that, although cultivated intensely, cannot offer billeting to large units.

In the lower and middle parts the Alps are overgrown with evergreen forests above which spread alpine pastures, due to which forestry and cattle-breeding are the main branches of agriculture.

a. The Southern Alps (limestone)

This zone is divided into three main mountain massifs: the Julian Alps, Karavanke and the Savinjske Alps with the Kamnik mountains. These high mountains extend south and eastward to the zone of mountains of medium height and low mountains spreading at their foot.

The Julian Alps

The Julian Alps extend in our country northward and northeastward to the river Sava, and in the south to the line: the river Ljubljanka - the river Idrija.

This is the highest mountain series in our Alps and at the same time the highest in Yugoslavia. By the upper Soca, the river Koritnica, the saddle Prede

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and the river Ziljica it is divided into two mountain groups: the western group with the summit Kanin (elevation 2585 m) across which runs the present state frontier and the peaks Rombon (trig. 2208) on our side, and in Italian territory the Montazio (trig. 2754); the eastern group with the peaks Mangrt (trig. 2678), the Jelovec (elevation 2643 m), the Triglav (trig. 2863), the Skrlatica (elevation 2738 m), the Krn (trig. 2245) and many other peaks over 2,000 metres. Eastward, the Triglav drops down into the table-land Pokljuka. These two massifs, the western and the eastern, are very strong defensive zones that can be easily defended by weak forces by the blockade of a few saddles. The western massif protects the valley of the river Soca, along which important lateral communications run, and the eastern massif the valley of the river Sava.

Important saddles and crossings from the Soca valley across the frontier to Italy are: the saddle Predel (elevation 1156 m, highway Bovec - Trbiz), the valley of the river Uoaja (highway village Zaga - the valley of the river Ter - Tarcent - the valley of the river Tagliamento).

Important saddles and crossings leading from the Sava valley across the eastern massif to the Soca valley and the Kanalska Dolina: the passage from the Sava Dolinka to the Ziljica valley, Kranjska Gora - Ratece - Trbiz (railway and highway); the saddle Vrsic (elevation 1661 m), highway Kranjska Gora - the upper Soca - Bovec.

The orographic knot of the Julian Alps is the Triglav from which a number of ridges of high mountains extend in all directions: northwestward across the Jelovec (elevation 2643 m) to the Mangrt; northward and northeastward several ridges toward the Sava Dolinka across the peaks of the Skrlatica (elevation 2738 m) southwestward across the lakes of the Triglav and from here towards the massif of the Krn and southeastward and eastward across the peak Rodica (trig. 1962). Several valleys, along which best communications run - mainly paths, lead from the Sava and the Soca valley towards the massif of the Triglav.

South of the line: the river Sava Bohinjka, the river Bacia, Koberid, the upper Nadiza, Djemona the greater part of the terrain is of mountains of medium height, and its smaller part are low mountains. The ridge Kolovrat with the summit Matajur (trig. 1643) on the Italian frontier extends along the right bank of the Soca from Kobarid to Gorica (Gorizia). The slopes of the Kolovrat from the Matajur to west of village Volce steeply fall down into the Soca, and gradually, in the form of long spurs, westward and southwestward, so that relief advantages in this section of the Kolovrat are on the western side. Mountains of medium height with the peaks Porezan (trig. 1622 m), Blegos (trig. 1562 m), Tose (trig. 1021) extend along the left bank of the Soca to the Sava. They are rocky and difficult to pass (saddles are about 1,000 m high), and by the surface structure they are similar to the Dinara system having some characteristics of this system (karst here and there). Across this region two second-class highways run to the Soca valley: Skofja Loka - Zeljeznik - Podbrdo - Tolmin and Skofja Loka - Gorenja Vas - Corlmo - Tolmin. This southern road forks into several good second-class and third-class roads running towards Ljubljansko Polje, Vrnika, Donji Logatec and Ajdovscina.

Country at the foot of a mountain range is more suitable for all combat actions than high mountains, and therefore more important from the military point of view, because it has more communications, is better passable, and conditions for living and for quartering are more favourable. Water and other supplies are available. Terrain is forested and conceals the disposition and activities of troops.

The Karavanke

The Karavanke extends from west to east as an unbroken chain of high mountains steeply falling northward into the valley of the river Drava, and more steeply southward into the valley of the river Sava. The western border of the

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Karavanke is the river Ziljica, the northern and eastern the Drava and the Mislinja, and the southern border the Sava Dolinka, the Kokra, Jezerski Vrh and the valley of the upper Savinja.

The northern slope is of slate and granite, and the southern and the ridge itself of limestone. Due to this, the ridge is sharp, teeth-like and with sharp points.

The highest peaks are: Kepa (trig. 2143), Stel (trig. 2236) and Kosutnikov Turen (elevation 2134 m).

East of Jezerski Vrh the Karavanke is lower than 2,000 metres, except the peak Pec (trig. 2114), wooded and difficult to pass. There are several saddles, but only paths and ordinary roads run across them.

The Karavanke continue in the east in low mountains of medium height: the Mozirska Planina, the Kozjak, the Konjska Gora and the Maceljsko Pogorje; all are forested, easy to pass and communicative. These are last positions for the defence of the Celjsko Polje, Rogatecko Polje and the valley of the river Bednja.

There are three saddles in the Karavanke: Koren (north of village Podkoren), Ljubelj and Jezerski Vrh (highways to Austria).

The Karavanke, high mountains, difficult to pass, covered with karst on the top, is a partition wall between PFRY and Austria. Operations of strong forces are canalized to the three above mentioned saddles which can be easily blocked and defended on both sides; neither of the countries is in a better or a worse position. The Karavanke is a narrow mountain chain from the convergence (Pec) to the saddle Ljubelj, due to which the organization of defence in depth is impossible on this sector; east of the saddle Ljubelj the depth, in connection of the Savinjske Alps, is considerably greater, so that conditions for a deeper defence and protection of the Kranj and Ljubljana Polje are more favourable.

The Savinjske Alps

These mountains extend south of the eastern part of the Karavanke along the both banks of the upper Kokra and Savinja; they are in close connection with the Karavanke - the saddle Jezerski Vrh is the border between the Karavanke and the Savinjske Alps. Ridges and peaks above 1,500 m are bare, sharp and very difficult to pass, while slopes are forested. The highest peaks: Storzič (trig. 2132), Grintavec (trig. 2558), Ojstrica (trig. 2349) and Kalski Greben (trig. 2223).

Only footpaths run across these mountains. The roads run round mountain massifs along valleys. There are the following highways:

Kranj - Jezersko - Zelezna Kapla (in Austria), second-class highway;

From Kamnik two second-class highways eastward to the valley of the river Savinja;

From Celje up the Savinka to village Flesnik (second-class highway).

The Savinjske Alps continue in the south in a chain of mountains of medium height and low mountains beginning with the Menina mountain (trig. 1508), extending along the left bank of the Sava, across the peak Javor (elevation 1131 m), the peak Mrzlica (elevation 1119 m), the Buhor (trig. 1023) and the Medvednica (trig. 1035 m). This chain is a suitable defensive line for the defence of the Sava valley between Ljubljana and Zagreb from an attack from the north and northeast.

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Foothills of the Alps

These foothills extend east of the Ljubljana lowland area, along the both banks of the Sava, ending in the Krsko-Brezice lowland area, or in the border area of the Pannonia Plain; in the northeast they end with the Medvednica mountain (Slens trig. 1035) and the Ivanscica mountain (trig. 1061).

The foothills of the Alps, or the Slovenian For-Alps, consist of mountains of medium height and low mountains intersected by valleys and hollows around rivers and streams falling down from the high Alps. As a whole, the foothills of the Alps are very important economically. In addition to favourable conditions for agriculture, they are rich with water power and coal (Trbovlje); they are forested with good communications and well populated. Since the general direction of the extension is west-east, they are very good positions for blocking the river valleys behind them.

On the border of the foothills of the Alps the Sava has out a defile from village Kresnice (8 km west of Litiija) to Krsko, along which important international communications run.

Along the right bank of the Krka, from the line Novo Mesto - Metlika to Samobor, extends the Gorjanci Zumberacka Gora mountain which is of limestone. It drops down steeply into the valley of the Krka, and gradually into the valley of the river Kupa. From the southeastern part of the Gorjanci extends a low slope to near the mouth of the Kupa; it is the Vukomerike Gorice (trig. 253); it separates the Sava valley from the Karlovac lowland area on the middle part of the Kupa.

b) Primeval Alps

Of these Alps we are in possession of southern spurs extending along the left bank of the Drava: the Kosenjak (trig. 1522) and the Kozjak (trig. 966); they are mountains of medium height and low mountains, poorly communicative, overgrown with dense forests, steeply falling toward the Drava and thinly populated.

South of the Drava is a separate part of the Primeval Alps - the Pohorje (trig. 1542), a forested mountain of medium height with paths and poor roads only; better communications run around this mountain in the north along the Drava valley and in the south.

The Kosenjak and the Kozjak in the north and the Pohorje in the south form a defile about 55 km long (from Dravograd to Maribor) through which runs the Drava. These mountains and the Drava defile together with them are strong positions for the defence of the Savinjsko and Celje Polje.

North of the Kozjak begins the Slovenska Gorice (trig. 402) extending south-eastward between the river Pesnica and the river Mura to Cakovec; it is a hilly, fairly wooded terrain, with famous vineyards and good communications. The Slovenska Gorice is the watershed between the Drava and the Mura, and from the military point of view it is a suitable manoeuvring ground and a good position for the protection of the Drava valley and the Ptuj Polje. The region extending between the Drava and the Mura east of the line: Ljutomer - Ormoz is called Medjmurje. It covers the eastern spurs of the Slovenska Gorice, and from Cakovec to the mouth of the Mura the plain is about 20 km wide.

Prekomurje is a comparatively small region, but it is important due to its enveloping position in relation to the western part of Hungary. From Prekomurje the shortest lines of operations (the valley of the river Zela and the river Raba) lead to the territory west and north of Lake Balaton. On the contrary, as a bridgehead north of the Mura, it strengthens the protection of vital objects - Maribor and Ptuj.

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According to its relief, Prekomurje has two parts: the northern, a hilly region, characterized by the ridge which extends southeastward from the convergence to the line of village Dubrovnik; its slopes fall gradually down reaching in the south near the river Landava; eastward and northeastward its spurs extend to the Hungarian territory, with slopes forested, well populated and communicative and passable. The southern part of Prekomurje is a plain, in fact, the valley of the Mura, which is in the eastern, frontier area swampy. There are dikes along the Landava and its northern tributaries. In the other part the plain is passable, fertile and densely populated.

From Prekomurje to Hungary there are two railway lines, two highways and several secondary roads. These railway lines connect Prekomurje with the rest of our territory across railway bridges at Mursko Sredisce and Verzej; at these places and at village Radenci there are road bridges. Along the plain from Donja Landava, via Murska Sobota toward Radgona (Austria) runs a second-class highway.

In the region of the Alps, between mountains, there are many greater or smaller hollows and fields. Most important are:

a) in the Sava valley: the Kranj lowland area on the left bank of the Sava and Sorsko Polje on the right bank; these two hollows are naturally connected by the Sava valley with the Ljubljana Polje in the south and further on south of Ljubljana with Ljubljansko Barje. This alpine region - the Ljubljana lowland area is very important from the economic and military point of view, for it is fertile, densely populated and with good communications, with highly developed heavy industry and timber industry. Surrounded by high mountains that are wild, difficult to pass and poor with sources for the supply of an army, this plain is of tremendous importance; international transcontinental communications from Italy and Austria to Zagreb and Belgrade run across it. Ljubljana is the junction. This area is economic and vital centre of Slovenia with Ljubljana in it as the political, economic and cultural centre of PR of Slovenia. The Ljubljana lowland area is situated on the crossroads of communications between the Danube Basin and the Adriatic Sea, alpine countries and Balkan Peninsula. Through the Ljubljana Gapp, Postojna, the saddle Razdrto and the Vipava valley the Romans from Lombardy and the Venetian Plain invaded the Danube Basin and the Balkan Peninsula.

b) in the Savinja valley: the Savinja valley extending from village Radmirje (the upper Savinje) to Celje. Important communications from Dravograd southward and eastward run along this valley; the junction is Celje.

As the Ljubljana Plain with hollows around it is the vital area for Western Slovenia, so is the Savinja valley for Northern and Central Slovenia. Important industrial enterprises are located in the Savinja valley, and also all branches of agriculture are well developed.

The Savinje valley, like the Ljubljana Plain, is well protected by surrounding mountains.

c) in the Drava valley: the Drava field on the right bank between Maribor, Pragersko and Ptuj and the Ptuj field on the left bank of the Drava. These fields have the same characteristics as those under a) and b) and are vital centre of the northeastern part of Slovenia. The main junction and economic centre is Maribor; others are Pragersko and Ptuj. These fields are also naturally protected, but less, since they are nearer to the Austrian frontier, and in the east nearer to Hungary, where the Slovenska Gorice extend between the Drava and the Mura (ground suitable for manoeuvre, easily passable in all directions); thus being not a strong obstacle.

d) in the Mura valley: the Mura field between Radenci and Ljutomer on the

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right bank, and Ravensko Polje between the river Kucinea and Murska Sobota and Dolinsko Polje between Murska Sobota and Donja Lendava on the left bank. These fields have the same characteristics as those under a), b) and c) and are important economic centres of the northeastern part of Slovenia. Important junctions are: Radgona, Ljutomer, Mursko Sobota and Donja Lendava. The manoeuvring terrain of Prekomurje protects these fields from the north and northeast and the Slovenske Gorice from the west; in the east toward Hungary and in the northwest toward Austria they are open.

e) in the Krka valley: Krsko Polje, drained and fertile, well protected by the surrounding low mountains. Very important for in the operations between Ljubljana and Zagreb it is a by-pass way round the narrow valley of the Sava from Ljubljana via Novo Mesto and Kostanjevica toward Brezice. This field is naturally connected with Posavina (the Sava valley) southeast of Brezice. Posavina begins at Samobor and Zapresic getting wider towards Zagreb.

The Croatian-Slavonian Mountains -

These mountains extend southeast of the line Zagreb - Varazdin, across Croatia and Slavonia, ending with the Fruska Gora, whose farthest spur is the Bezanjski Kosa at Zemun. They follow the Drava and the Danube in the south, forming important positions for the defence of these rivers.

Individual mountains are:

The Kelnicko Gorje (trig. 643), the Bilo Gora (elevation 207 m), the Psnj (trig. 984), the Papuk (trig. 953), the Kradija (elevation 697 m), the Dilj Planina (trig. 459), the Pozeska Gora (trig. 616) and the Fruska Gora (trig. 539). Southwest of the Bilo Gora, between the river Lonja and the river Cezma is the isolated Moslavacka Gora (trig. 489).

The above mentioned mountains form a chain, which is cut by the Vinkovci Depression between Djakovo and Sid, and make the watershed between the Drava and the Danube on one side, and the Sava on the other and protects the Sava valley from the north.

The Croatian-Slavonian mountains, by their extension, height, depth and surrounding terrain, offer very favourable conditions for the defence of Posavina and, at the same time, protect the international communication Zagreb - Beograd, as well as the granary of Croatia and Slavonia. The depression between Djakovo and Sid is a vulnerable place across which the above mentioned international communications might be threatened from the north.

In Croatia and Slavonia one-third is lowland and two-thirds are highlands.

Main lowlands in PR of Croatia are:

Posavina, extending along the Sava valley from the Brezice lowland area to the mouth of the Sava. Posavina is the granary of Croatia, very well cultivated, densely populated, of strong economic potential; overgrown with oak forests; from Zagreb to Belgrade across Posavina run all kinds of communications of the biggest capacity (highways, double railway track and the navigable Sava). Thanks to its direction of extension in relation to the Hungarian frontier and its capacity, Posavina is a first-class lateral line of operations. From the north it is naturally protected by the ridges of the Croatian-Slavonian mountains and by the Fruska Gora, with the exception of the sector of the Vinkovci Depression; the surrounding low mountains are also overgrown with trees and other cultures.

The part of Posavina along the right bank of the Sava, between Zagreb and Sisak, is called Turapolje, and along the left bank, between village Osekovo and Jasenovac, is called Lonjsko Polje. These two fields have all the characteristics of Posavina, being its integral parts.

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Podravina, extending along the Drava from Legrad to Osijek, economically as rich as Posavina, but less forested. Podravina is a vulnerable area, being situated on the very frontier, where the Drava is the natural border (except Gola and Zdala communities where both banks belong to us). From the north it is naturally protected only by the Drava which is about 250 metres broad and always rich with water. Our bank is higher than the northern everywhere, with an insignificant exception east of Legrad and Lakoc, where the hillocks of the Hungarian side reach the very left bank; the valley is often flooded, especially in spring.

The slopes of the Croatian-Slavonian mountains reach the southern border of Podravina; they may strengthen the organization of the defensive zone along the Drava.

The Pozega lowland area, with important junction of roads and railways at Pleternica and Slavenska Pozega; sufficiently irrigated by the river Orlijava and its tributaries; well cultivated and densely populated; it is protected from all sides by low mountains with only one natural gap in the south toward Posavina, formed by the Orijava valley.

The Karlovac lowland area, or the Lower Pokulje, lies northeast of Karlovac, with the junction of communications - Karlovac. The river Kupa flows across this field; its tributaries water it and make it fertile. Towards the Sava it is open by the Kupa valley and by the plain at Klinec Salo. This field offers all the conditions necessary for quartering and supply of military units, and also for the use of all combat means, except during longer periods of rain. The central part of the field is densely forested, fairly swampy, thinly populated, poor with communications and quite difficult to pass. The peripheral parts only are well populated, passable and with good communications.

2. The Dinara System

The Dinara system covers the greatest part of the western zone of more recently formed mountains. Its borders are in the north: up to the line: the river Idrija, the southern border of Ljubljansko Polje, the upper Krka, Metlika, the river Kupa to Sisak, the Sava to the river Kolubara; in the east: the line: the Kolubara, the Ljig, the Dicina, the Ibar, the Sitnica and Metohija; in the south: the Beli Drim and the Drim, and its southwestern border is the Adriatic Sea.

The Dinara system rises abruptly from the Littoral to the highest peaks, and then gradually drops down toward the low Posavina and continues in the Pannonia Plain.

Limestone is predominant here. All the mountains from the lower Soca to Albania are of limestone which is often over 1,000 metres thick. By their karst characteristics they form the region of true, bare, waterless and deep Dinara karst. Along the internal zone, facing the Pannonia Plain, geological composition of the ground is various. This zone is full of rivers, overgrown with trees and the whole area looks like a green belt. The border between this green belt and the bare, karst zone was explained in the section "Karst". The economy of these two zones is also different. The karst, woodless zone is waterless and short of cultivated areas. The green zone, however, is important from the economic point of view. In lower parts towards the Sava are agricultural and orchard regions and in higher parts woods and pastures. The ranges of the Dinara mountains, except the farthest southeastern parts, extend from the northwest to the southeast. In the northern part the zone of the Dinara Mountains is the narrowest - from Ogulin to Novi (straight line) 35 km. Southward this zone becomes broader; between Dubrovnik and Cacak it is about 230 km wide. Southeastward the Dinara Mountains gradually turn in the southwest and from here bend from the normal Dinara direction, extending from the southwest to the northeast, via the saddle Gakor and the mountains Hajla, Zljeb, Mokra Gora, Rogozna towards the river Ibar. The Dinara mountain system is composed of parallel ranges and hollows between them, usually karst fields. Nevertheless, this mountain system is not an unbroken wall; there are also lateral hollows and valleys by which

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this system is divided into parts. All these gaps are very good defensive positions. The territory of the Dinara mountain system, as a whole, by its geographic position, great distance from the state frontiers, relief and passability, ores and water power, is our best protected and most suitable region for building up of our heavy and war industry.

The western part of this system is particularly short of suitable saddles across which the Adriatic Littoral would be connected with the hinterland. Therefore, important are the following natural gaps: Sibenik - Drnis - Knin - the river Una; the Neretva valley and the Bojana valley with the river Zeta.

In order that they might be studied easily, the mountains of the Dinara system are divided into the following series:

- a) The Istrian and the Slovenian-Rijeka karst;
- b) The Croatian highlands;
- c) Dalmatian Mountains;
- d) Bosnian Mountains;
- e) Herzegovinian Mountains;
- f) Montenegrin Mountains;
- g) The Prokletije, Metohian and Raska Mountains;
- h) West Serbian Mountains.

a) The Istrian and the Slovenian-Rijeka karst

This karst covers the area from the border of the Alpine system in the north and in the east, to the line Karlovac - Ogulin - Kraljevica in the south.

Istrian karst

General characteristics: limestone is predominant with typical karst phenomena: pot-holes, funnel-shaped holes in limestone formation, cracks in limestone, absence of normal surface streams, canyon valleys (the river Mirna and the river Rasa), very thin vegetation, fertility of soil and thin population. Ethnic characteristic: people have been Slovenians for 1,300 years. The economic characteristic corresponds to physical and geographical features. The original cover of woods has been taken off.

Istria is divided into three geographic regions:

- White Istria
- Grey Istria
- Red Istria

Each of these regions has its own geological, climatic, hydrographic, phytogeographic and anthropographic characteristics that have a specific influence on the activities and combat of the army.

White Istria is formed of Trieste karst and the Cicarije which are the northern border of the Istrian peninsula. From the southwest it is a part of Trnovski Gozd, Hrusica and Nanos, and from the northeast of the Pivka mountain and continues

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southeastward in Gorski Kotar in Croatia. White Istria is bare country of chalk limestone on which typical karst of white colour has been developed, thence the name of White Istria.

Due to medium height, about 800 metres above the sea level, the temperature is low, amount of rainfall fairly high, especially in the Ucka mountain, the wind is strong, middle-European vegetation poor. Due to this, the population is forced to occupy themselves with intense cattle breeding. Of the total area of the Cicarije 5% are pastures and meadows, 5% corn fields, 2.5% vineyards, 1% gardens and 3% sterile land. The Cici are shepherds, colliers and timbermen. Thinly populated: 25 per square km. No towns.

The Cicarija is a chain of low mountains and mountains of medium height extending from Trieste to Volosko. It steeply drops down southwestward, and gradually northeastward. It continues in another chain that ends with the summit of the Ucka (trig. 1396). Two second-class highways and a railway line run across the western part of the Cicarije and the Ucka, and a second-class highway in the eastern part, and also several secondary roads. The Cicarije is a strong obstacle between the Istrian peninsula and the rest of the country. The line: the Cicarija - the Ucka may serve as a position for the defence of the Istrian landing area.

Grey Istria is formed of sand and clay; grey colour is predominant, thence the name of Grey Istria. It has a normal hydrographic network on the surface so that the growth is luxuriant, but without Mediterranean elements; it is richer with water, the slopes of clay are washed out by rain so that cultivated land slips down; bottoms of valleys are swampy. The population occupy themselves equally with agriculture and cattle breeding (there are vineyards, too). There are from 50 to 100 inhabitants per square km. Larger settlements are developed on hillocks. In Grey Istria very important are the Buzet-Pazin lowland area in the centre and the Gopic lowland area southwest of the Ucka; they are most fertile parts of Grey Istria and, at the same time, most suitable for the concentration, quartering and supply of troops.

Red Istria is formed of a thick layer of red earth, hence its name. The line separating Red Istria from Grey Istria runs from the mouth of the river Dragonja to Plomin. Red Istria covers 70% of the total territory of Istria. Small bunches of trees and bush are traces of one time dense oak forests. A thick layer of fertile red soil gives vitality to flora. The environment of Pula, Porec and Buje are rich, well cultivated agricultural regions: vineyards are best here. Western parts (along the coast) are covered with almost unbroken zones of vines, olive trees, fruit trees and corn. Coastal localities and ports are: Pula, Rovinj, Vrsar, Porec, and Novi Grad in which one-third of all inhabitants of Istria live (100 per square km). West Istria is completely a Mediterranean country with a comparatively low amount of rainfall, up to 700 mm. It is an undulating ground with the average height in the north of about 450 metres, gradually dropping down to the shore. Red Istria is poor in water, and therefore, vegetation is thinner on the hills than in the hollows. In some places drinking water is not available and malaria appear there; such areas are not populated. Red Istria has a number of highways. The port of Pula is protected, large and best in Northern Adriatic. The entrance of the large harbour is 700 metres broad, with the shore 5 km long and the depth of the sea of about 30 m; it is mild and drinkable water is available. The eastern coast of Istria from the Cape Nera to the northernmost point of the Rijeka Bay is separated from other parts of Istria by a chain of mountains of medium height and low mountains extending along the coast.

The islands of Veliki and Mali Brioni are important because they block and protect the entrance of the port of Pula; these islands are tourist resorts now.

The main lowland in Istria is extending along the western coast with the average width of about 10 km. Inland, the important lowland areas are around Pazin, Buzet, Gopic and along the lower Rizana. Considering the geologic composition

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of soil in lowlands, bareness, shortage of water and weather conditions, shortage of army supplies, these lowlands, except the valleys of Grey Istria, are not very important. The valleys of the Mirna and the Rasa are flooded periodically, swampy; they are typical canyon valleys, and thus obstacles worth mentioning.

Conclusion about Istria. In whole Istria, except Grey Istria, the problem of water, wood, food and other supplies arises. The peninsula is open in the west and in the south, and protected by mountain ridges in the east, except from Cape Kamanjak to Cape Nera (Crna Punta) (Black Point). The whole territory of Istria is maneuvering ground with many phenomena of karst and its influence on combat actions; communicability is good (except White Istria). The ground rises from southwest to northeast and along the line Trieste - Opatija it is partitioned off by the Cicarija mountain. Mostly undulating and broken ground offers possibilities for the selection of suitable defensive positions, while deep river valleys are natural obstacles that ought to be taken into account.

Slovenian Karst

The Slovenian karst covers the area north of the Cicarije and the Ucka to the river Idrija and the southern border of Ljubljansko Polje, and in the east to the line: Metlika - Novo Mesto - the river Krka. Important sectors are:

- the **Baniska Planota** between Tolmin and Gorica, from 600 to 1000 metres high, partly wooded, of limestone, with many funnel-shaped holes, difficult to pass, waterless and thinly populated. Steeply drops down to the Soca and the Idrija. Its border in the east is Cepovanska valley, separating it from the Trnovski Gozd mountain. The Capovanska valley is waterless, with 300-400 metre high sides and an average width of about one kilometre, along which an important second-class highway runs from Gorica to Tolmin.

- the **Baniska Planota**, by its geographic position, is a very important sector, and by its topographic features a very strong sector within the natural defensive zone of the left bank of the Soca. In the north it borders the Julian Alps, in the south the peak (trig. 646) northeast of Gorica, and in the southeast the Trnovski Gozd, thus blocking the valley of the Beca and the Idrija; it considerably influences the defence of the line of operations; Gorica - Ajdovacina - Ljubljana, the Vipava valley and the line of operations: Gorica - Postojna - Ljubljana.

- the **Trnovski Gozd** extends between the Cepovanska valley and Ajdovacina, from 900 to 1400 metres high, of limestone, densely forested, short of drinking water in summer, and almost unpopulated. In the south it borders the mountains Hrusica and Nanos, and together with them blocks the Vipava valley from the north to the east. Drops abruptly down to the Vipava valley. By its physical characteristics unsuitable for the action of larger units and a serious obstacle to them.

- the **Hrusica** extends between Vipava, Postojna and village Planina. Similar to the Trnovski Gozd. In the south it is connected with the Nanos mountain which has the same characteristics as all the above mentioned mountains of the Slovenian karst. On the southern border of the Nanos is the important saddle Razdrto, a cross-road of the first-class highway Ljubljana - Postojna - Vipava - Nova Gorica and Postojna - Razdrto - Trieste.

The **Komenski Karst** extends between the Soca, the Vipava and the Adriatic Sea; in the east up to the line: the saddle Razdrto - Trieste. Consists of several low ridges running parallel to the sea, dropping abruptly down in all directions, especially to the Vipava and the sea. This region is also a karst area, thinly populated, short of drinking water, mostly bare, with the average height above sea level of 350 metres, with individual peaks from 400 to 600 metres, well

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communicative, but fairly difficult to pass. The junction of communications is Komen.

The westernmost part of the Komenski karst belongs to Italy, ending there with a peak (trig. 275) and the Doberdob plateau; it is a strong Italian bridge-head on the left bank of the Soca on the line of operations Trzic - Trieste - Rijeka and Gorica - Ljubljana.

The whole series of the Slovenia karst mountains has the common characteristic of karst regions with all specific features influencing combat actions; it is a serious obstacle to the advance across the Soca eastward and vice versa.

The Vipava valley is worth mentioning here. Its bottom is water-tight; hydrographic network well developed; it is fertile under the influence of Mediterranean climate, well cultivated (covered with vineyards), densely populated and with good communications. A first-class highway runs from Gorica to Trieste and Pula, and in the north along the Soca valley to Bovec, towards the saddle Predel (elevation 1156 m) and the saddle Vrsic; in the east over the saddle Razdrto to Postojna or via St. Peter na Krasu (Pivka) to Rijeka.

In the rest of the eastern area of the Slovenian karst there are three furrows extending from the south to the north.

The western furrow: Rijeka - the valley of the river Reka - the valley of the river Pivka - the river Unec - Vrhnika.

The middle furrow: the valley of the upper Kupa - the river Cabranka - the Loz lowland area - Lake Cerknisko.

The eastern furrow: the Kocevje lowland area - the Ribnica lowland area - Turjak - Ljubljana.

Between the western and the middle furrow extends the Pivka mountain with the peaks Sneznik (trig. 1796) and Javornik (trig. 1268); it is densely forested, difficult to pass, thinly populated and almost waterless.

Between the middle and the eastern furrow are mountains of medium height and low mountains covered with woods and large pastures in higher regions, and with fields and meadows in lower regions; sufficient amount of water is available; the peaks are: Gotenski Sneznik (trig. 1289), Velika Gora, Mokrec and Krim (trig. 1107) extending from the northwest to the southeast. East of the eastern furrow are: the Kovevski Bog and the Mala Gora.

This whole region is characterized by a number of subterranean rivers.

The Bela Krajina lowland area (around Crnomelj and Metlika) is important. It is an area full of vineyards.

Main communications are:

Second-class highways from the Ljubljana lowland area to the Kupa valley: Ljubljana - Novo Mesto - Metlika - Karlovac; Ljubljana - Ribnica - Kocevje - Brod na Kupi; Ljubljana - Velike Lasce - Loz Cabar; for the connection with the littoral; Ljubljana - Donji Logatec - Postojna - St. Peter na Krasu (Pivka) - Ilirska Bistrica; Novo Mesto - Kocevje - Ribnica - Loz - St. Peter na Krasu; Velike Lasce - Cerknica - Postojna - Razdrto - Sezana; Cabar - Prozid - St. Peter na Krasu.

The importance of these furrows and mountain ranges between them is very great. The above mentioned furrows in this karst region are natural lines of communication and operations, making possible the construction of communications and movement of almost all branches of the army. Along a part of the middle furrow

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economic potential and in relation to the Croatian (Lika) highlands more suitable for operations in any direction.

During the Fourth Offensive, in January 1943, Kordun was the concentration area of the German SS Division "Prince Eugen" for the Operation "Weiss I" for the advance along the general line of operations: Karlovac - Bihać - Bosanski Petrovac, and the Northern Banija the concentration area of the German 369th Division.

c) Dalmatian Mountains

These mountains extend between the Adriatic Sea, the river Zrmanja, the Dinara mountain, Imotsko Polje, Vrgoracko Polje to the Neretva at Metković. The whole region is bare, except a small area north of Knin and some areas northeast of the Mosor and north of Vrgorac. Northwestern part from the coast to the line Novigrad - Benkovac - Biograd is a flat area known as Kotari. The coastal zone, wide about 16 km, is completely a flat area. From the line Novigrad - Benkovac - Skradin extend a hilly belt, as the first stronger position in the hinterland of Zadar and Biograd. From Sibenik to Split, along the coast, extend low mountains the Vilaja (trig. 738). From the Opor (trig. 690) and the Kozjak (trig. 780). The next defensive zone would be the mountains: the Orljak (trig. 674), the Promina (trig. 1148), which is rich in coal and bauxite, and the Mosor (trig. 843).

East of the valley: Kosovo - Petrovo Polje - the valley of the river Vrba - Klis and sea coast to the river Neretva extend the Dalmatian mountains of medium height, among which worth mentioning are: the Svilaja (trig. 1509), the Mosor (trig. 1340) and the Biokovo (trig. 1762) above Makarska. The ridges of these mountains are narrow, sharp and bare and the sides like terraces, steep, bare and only in lower regions overgrown with "makija" and bushes. From the Biokovo south-eastward the ridge drops down to the Neretva and extends into hilly terrain.

Dalmatian mountains include the Dinara mountain, too, which extends from the upper Una and Zrmanja to Busko Blato. In the southwest it borders the Sinj and the Vrljika lowland areas and the upper and middle part of the Cetina. The Dinara is an unbroken ridge extending southeastward, of an average height of 1700 metres; its highest peaks are: Dinara (trig. 1831), Troglav (trig. 1913) and Konj (trig. 1841). Its sides are steep, of karst and difficult to pass; the eastern slopes are wooded, while the western are predominantly bare; population thin, mostly in surrounding fields.

The importance of the area west of the valley Kosovo - Petrovo Polje - the river Vrba and the importance of the area east of it are different from the military point of view. In the western part flat ground on the coast makes landing of troops possible, and its passability the advance inland. Such favourable lines of operations are: Zadar - Obrovac - the Zrmanja valley - the Una valley or Biograd - Benkovac - Knin - the valley of the river Butusnica - the Una valley or Sibenik - Drnis - Petrovo Polje - Kosovo - Knin - the Una valley. In this western area the hilly ground offers a number of successive positions that block all lines of operations. The eastern area, considering the relief, has similar characteristics to the Velebit in the Croatian (Lika) highlands. The strongest position, somewhat deeper behind, is the Dinara ridge, since there is only one second-class highway from Sinj to Livno. This ridge can be passed round only on the flanks: in the north, along the second-class highway Knin - Drvar, and in the south, Sinjsko Polje - Arzano - Duvno, so that it is a very strong zone for the defence of West Bosnia.

Important lowland areas in Dalmatia are: Kotari, Kosovo at Knin, Petrovo Polje at Drnis, Vrljicko Polje around Vrljika, Sinjsko Polje, 15 km long and 7 to 8 km wide, and Imotsko Polje. These fields are well cultivated; drinkable water is available and conditions for quartering and supply of small units are favourable. Important communications, connecting the Adriatic Coast and the hinterland, as well

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as lateral communications running parallel to the extension of mountain ranges and numerous fields, run across them.

Communications worth mentioning in the western area are: second-class highways Zadar - Obrovac - Gracac; Bankovac - Knin; Sibenik - Drnis - Knin; Zadar - Biograd - Sibenik - Split. The railway line: Split - Sibenik - Knin. In the eastern area the junctions are Split and Sinj, and most important communications are: Split - Sinj (second-class road and railway line); Omis - Imotski (second-class road); Makarska - Ljubuski; second-class highway along the coast Split - Metković; behind the mountains runs the lateral second-class highway Knin - Sinj - the Cetina valley - Vrgorac - Metković or Sinj - Imotski - Ljubuski - Capljina. From northern and middle Dalmatia there are two general lines of communications separated by the Dinara. One of them runs between the northern part of the Dinara and Obrovac to the Sava valley; the other between the southern part of the Dinara and the sea eastward to Mostar and Sarajevo.

d) Bosnian Mountains

The Bosnian mountains extend between the Dalmatian mountains, the middle part of the Neretva, the Ivan Sedlo, Sarajevo, the river Zeljeznica, the river Bistrica, the river Drina, the river Sava, the river Una. This mountainous region includes the following groups of mountains: mountains of West Bosnia, Bosnian mountains of medium height and Bosnian fore-mountains.

Mountains of West Bosnia

The Croatian (Lika) highlands extend across the upper Una into the region of mountain ranges and hollows of West Bosnia. These highlands extend from the upper Una to the middle part of the river Neretva, the river Rama, Gornji Vakuf, the source of the river Pliva, Kljuc, Bosanska Krupa. This region is difficult to approach and to pass; it is a geographic middle in the relief of Dalmatian and Bosnian mountains. It is characterized by long mountain ranges extending from the northwest to south-east. Between the ranges lie large, long karst fields. Bottoms of fields are of lake sediments with layers of hard coal and lignite. Mountains, rising above these fields, are covered with large forests and pastures, but according to their geologic composition they have all the characteristics of the karst. The zone of the high mountains begins with the Dinara range along which the border between Dalmatia and FR Bosnia and Herzegovina runs.

Parallel to the Dinara (which is the first range) extends a second, shorter range, composed of mountains: the Vigenac (trig. 1650), the Sator (trig. 1872), the Staretina Planina (trig. 1675) and the Velika Golija (trig. 1891). The Velika Golija is naturally connected with the Gincar mountain; between these two ranges are:

- Grahovsko Polje, of local importance; a second-class highway runs across it from Livanjsko Polje via Bosansko Grahovo to Drvar and further on to the Sava valley. The altitude above sea level is over 800 metres; composed of a few small fields which are dry, with a thin layer of earth, partly covered with karst, with the smaller part cultivated and the greater covered with pastures.

- Livanjsko Polje - the largest of all hollows in West Bosnia (711 metres above sea level, surface area: 380 square km, 60 km long and 10-15 km wide). The bottom is flat and under water 7-8 months in the year. The northern part is swampy; in the southern is Busko Blato. Otherwise, the soil is fertile and sown with various cultures in summer; intersected by subterranean streams.

Livno is the road junction. There are the following second-class roads:

Livno - the saddle Vaganj - Sinj - sea coast,

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Livno - Kupres - Bugojno (to the valley of the river Vrbas),

Livno - Sujica - Prozor (to the valleys of the Rama and the Neretva),

Livno - Glamoc - Drvar (to the valleys of the river Una and the Una),

Livno - Bosansko Grahovo - the Butusnica valley - Knin or from Bosansko Grahovo to Drvar,

Livno - Prisoje - Arzano, from where the second-class road forks in all directions,

Livno - Prisoje - Duvno.

In the environment of Livno there are coal mines.

Due to the great importance of Livno as a junction of roads and the line of extension of Livanjsko Polje, the Germans, in the Fourth Offensive 1943, during the "Weiss II" operation, ordered the SS Division "Prince Eugen" to operate along the following line of operations: Livanjsko Polje - Drvar - Bosansko Grahovo - Livno - Duvno - Mostar.

The third range are the following mountains: the Osjecenica mountain (trig. 1796), the Klekoveca (trig. 1961) with the Lunjovaca (trig. 1706), the Gincar (trig. 2006), the Ljubusa mountain (trig. 1797), the Vran mountain (trig. 2074) and the Cvrnica (trig. 2228). Between the second and third range is the valley of the Una and hollows:

• Glamocko Polje, the surface area of which is 130 square km, about 35 km long, but very narrow (3-4 km). The northern part is swampy and flooded from autumn to May; there are two lakes in the southern part of Glamocko Polje; altitudes above sea level is 882 metres; a second-class road runs across Glamocko Polje from Livno to Drvar and forks on to Mrkonjic Grad.

During the Fourth Offensive in 1943, in the period of the "Weiss II" Operation, the German 369th Division advanced across this hollow along the general line of operations: Kljuc - Glamoc - Livno.

- Duvanjsko Polje, the surface area of which is 122 square km, 862 metres above sea level, long about 15 and wide about 10 km. The main river is Sujica, the flowing off stream of Kupresko Polje; in addition to it there are some other subterranean streams. This is the driest, best drained field in this region. Barley is the most cultivated culture.

The fourth range is composed of the following mountains: the Grmac (trig. 1604), the Srnatica (elevation 1341 m) and the Struganica (trig. 1478); the range is broken here and continued in the southeast with the mountains Vitrog (trig. 1907) and Radusa (trig. 1956).

The Grmac may serve as a very suitable position for the defence against the attack from the north and for blocking the lines of operation leading to Knin and Drvar.

The fourth range is separated from the third by the following hollows:

- the Bihac lowland area on the Una;

- the Bosanski Petrovac lowland area, in which Bosanski Petrovac is situated, and important junction of roads running towards the Una and the Sana valleys, and southward to Drvar;

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- the southwestern slopes of the Grmec mountain (east of Bosanski Petrovac) are called Bravsko Polje. It is woodless land with pastures, 1,100 to 1,200 metres above sea level. The second-class road from Bosanski Petrovec to Kljuc runs across it;

- Kupresko Polje, the surface area of which is 93 square km, altitude above sea level 1,100 metres, due to which it is cold in Kupresko Polje. It is about 14 km long and from 5-10 km wide. An important second-class highway runs across Kupresko Polje from the Vrbas valley (from Bugojno) to Livno and Duvno. Although situated fairly high, barley, wheat and oats are cultivated successfully. The smaller part of it are fields, the greater pastures;

Ravno Polje (between Kupres and Duvno) is of local importance. Across this hollow a second-class road runs from Duvno via the Prozor saddle to the Neretva and the Vrbas valleys. Vukovsko Polje is between Kupresko Polje and Ravno Polje;

- the valley of the river Rama to its mouth; its sides are steep, but an important highway runs along it from the Neretva valley to the Vrbas valley (via the Prozor saddle) and to Split.

From the military point of view the mountains of West Bosnia, with their parallel ridges extending from the northwest to southeast, are a strong obstacle with several successive defensive positions against the advance from the Dalmatian Littoral. In relation to Dalmatian mountains they would form the next defensive zone. They are suitable because their ridges are long and lie parallel to long valleys; a few communications cross them and even these can be quickly blocked and defended by weak forces.

In the north-south operations individual ridges would play the role of partition walls, making difficult signal communication and cooperation between individual columns.

The hollows (Livanjsko Polje, Duvanjsko Polje, Glamocko Polje, Grahovsko Polje, Imotsko Polje) may serve as the only suitable areas for the concentration of troops.

These mountains are mostly forested; forests are like primeval forests here and there. The western part is partly covered with karst and is completely bare on southwestern slopes, while the northern slopes are forested. They are difficult to pass either because of karst or because of forests, or because of both. In winter time these mountains are covered with deep snow and movement is impossible. The fields are flooded, and when water flows off, impassable till the middle of summer. Strong, cold winds and mist make movement difficult. Settlements are concentrated in hollows and lowland areas where small tactical units can get almost all supplies.

Bosnian Mountains of Medium Height

These mountains are northeastern and eastern spurs of mountains of West Bosnia extending northward to the line: Bosanski Novi - Banjaluka - Dobo - Tuzla - Zvornik, i.e. to the furrow that makes the valleys of the rivers: the Sana, the Gomjenica, the Vrbanja, the Usora and the Spreca; in the east, they extend to the river Drina, and in the south to the line: the Sarajevo lowland area - the river Zeljeznica - the river Bistrica to its mouth.

Here, on the left bank of the upper Vrbas and on the right bank of the Rama ends the region of pure karst with large karst fields and bare and dry karst mountains, and begins the green wooded zone, rich in streams and sources, the mountains of which are gradually sloping down to Posavina.

Karst appears here and there, lying over impermeable rocks, so that karst appears on the surface only without karst fields.

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Bosnian mountains of middle height are divided into four sectors by deep valleys of the Sana, the Vrbas and the Bosna:

The sector between the lower Una and the Sana: only two mountains: the Majdan (trig. 650) and the Lisac (trig. 807).

The sector between the Sana and the Vrbas is filled with mountains: the Manjaca (trig. 1239), the Lisina (trig. 1457) and the Dimitor (trig. 1483); moderate karst appears here, covered with woods. There are two roads: Kljuc - Mrkonjic Grad - Jezero - Jajce and Kljuc - Banjaluka.

The sector between the Vrbas and the Bosna. In the southern part of this sector mountains are higher (south of the river Lasva): the Vranica, the Bitovnja; north of the river Lasva are: the Vlasic (elevation 1943 m), the Gemernica, the Borja and the Uzlomac.

The whole sector is forested; first-class pastures are in the Vlasic mountain.

Communications worth mentioning are: Banjaluka - Doboj (second-class highway and railway line) and some parts of narrow-gauge railway lines, as well as the narrow-gauge railway line Donji Vakuf - Travnik - Zenica. Good roads run along the Vrbas valley and the Bosna valley, and along the Bosna valley also a narrow-gauge railway line and a normal railway line.

The sector between the Bosna and the Drina. East of Sarajevo in the Romanija (trig. 1629), a karst mountain with steep rocks in the south.

North of Sarajevo, between the Bosna and the Krivaja are: the Ozren (trig. 1532), the Zvijezda (trig. 1355), the Graben and the Ravan mountains, and between the Krivaja and the Spreca are: the Javor, the Konjuh and the Ozren; all are densely forested, interspersed by abrupt ridges, difficult to pass and rich in ores.

South of Sarajevo is the Trebevic (trig. 1629) and southeast the Jahorina (trig. 1913).

Plateaus and mountains of this sector are covered with woods and pastures, so that cattle breeding is developed. This region has been without communications so far, except some narrow-gauge railways in forests constructed during the Austro-Hungarian reign for the exploitation of forests. East of Sarajevo, between the Romanija and the Jahorina, a narrow-gauge (0.76 m) railway line and a second-class highway from Sarajevo to Visegrad and Titovo Uzice are under construction.

Bosnian mountains are rich in ore, first of all iron-ore.

The zone of mountains rich in ore, as stated above, begins with the Petrova Gora and the Zrinjska Gora in Croatia, extending over the Una southeastward to mountains rich in ore in Middle Bosnia. This zone is naturally extended over the Drina and ends with the Podrinje mountains in Western Serbia (the Gvoevo, the Boraenje, the Jagodnja, etc.). Among the mountains rich in ore in Bosnia, the low mountain Majdan (trig. 650) is worth mentioning because of iron ore with the mine Ljubija, southwest of Prijedor, then high mountains rich in ore between the upper Vrbas and the upper Bosna; the Bitovnja (trig. 1744) above the Neretva, the Vranica (trig. 2112) at Fojnica and the Vlasic (elevation 1943 m) at Travnik. This whole region around the upper and middle Bosna is rich in coal, iron and other ores (Vares, Zenica, Kakan and Breza), so that the valley of the middle Bosna is becoming the centre of our heavy industry; thence the great importance of the Bosna valley from the economic and military point of view. In addition to ores, these mountains are rich in forests, in lower parts deciduous, in higher, evergreen and pastures, so that in addition to mining, conditions for timber industry and cattle-breeding are favourable.

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Lowland areas worth mentioning are:

- the Prijedor lowland area, with the river Gomjenica (a tributary of the Sana) flowing across it and the Sana. This field is about 30 km long and from 8 to 10 km wide, highly fertile, wooded and well populated, offering all supplies for the army. Drinkable water is available. Communications from Banjaluka to the Una valley and those running northward along the Sana valley cross it. Prijedor is the junction. This area is surrounded and protected by low mountains;

- Skoplje, in the valley of the upper Vrbas (extending from Gornji Vakuf to Donji Vakuf with Bugojno in the middle), about 30 km long and from 3 to 5 km wide; it is the most fertile lowland in Bosnia and densely populated. Across it run a second-class road and a narrow-gauge railway line from the Bosna valley via Travnik to the Vrbas valley at Donji Vakuf. From here they run southward via Bugojno to Gornji Vakuf and northward to Jajce. The only second-class highway to Split runs from Bugojno, Kupresko Polje and Livnjsko Polje;

- the Zenica lowland area in the Bosna valley, in which our heavy industry is under construction now;

- the Doboj lowland area at the mouth of the Spreca, in which our important railway junction is under construction. From this area northwestward leads a valley along the Bosna, spreading from Modric on to Posavina;

- Glasinacko Polje is at the altitude of about 900 metres; it is rather small, with good pastures and some crops. The junction is Podromanija, with a second-class highway coming from Sarajevo and forking to Rogatica and Vlasenica. Karst is predominant in western and southern parts; thinly populated, economically poor and unimportant for the troops that would operate here;

- the Sarajevo lowland area lies west of Sarajevo, around the upper part of Bosna which receives two tributaries in it: the Zeljeznica and the Miljacka. It is about 20 km long (north-south), from 7 to 10 km wide (east-west), with the altitude above sea level of about 500 metres. It is well drained, and therefore seldom flooded. The ground is flat, fertile and well cultivated. It is a junction of important communications running convergently from various directions: from Posavina along the Bosna valley, from the Adriatic Sea along the Neretva valley via Mostar and the Ivan mountain; from the Drina valley along the Fraca valley and from Zvornik via Vlasenica and the Romanija; from the Vrbas valley via Travnik and Kiseljak; from Herzegovina - Nevesinjsko Polje and Gatacko Polje - via Kalinovik and along the Zekjeznica valley. This area is economically strong; well protected by surrounding mountains.

The Romanija and the Jahorina block the Fraca valley in the west, and thereby the approach to Sarajevsko Polje from the east, from the Drina valley.

The Zone of Bosnian Fore-Mountains

These mountains extend north of mountains of the central massif, that is north of the line: the Sana, the Gomjenica, the Vrbas, the Usore, the Spreca to Zvornik and further on, including hilly ground, slope down to the Sava valley. This hilly ground, especially along rivers are the richest regions of Bosnia.

Individual mountains are separated by the same rivers as the mountains of Central Bosnia; worth mentioning are:

- the Kozara (trig. 978) between the Una and the Vrbas; north of it along the Sava extends the Prosara (trig. 363), and west of it, on the Sana and the Una, hilly terrain with the peak Kriva Glava (trig. 446). This area is forested except the northern slopes of the Kozara.

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The Kozara with other northern spurs on the Bosnian fore-mountains may serve as a position for the defence on the right bank of the Sava for checking the advance from the north; besides, it served to our forces for threatening communications south of it. So, during the Fourth Offensive, in 1943, our forces from the Kozara threatened the communication: Kostajnica - Bosanski Novi - Prijedor - Banjaluka along which the 714th and 717th German divisions were bringing up supplies.

- the Motajica (trig. 652) between the Vrbas and the Ukrina extends along the bank of the Sava; wooded and steeply drops down into the Sava.

- the Vučjak (trig. 352) between the lower Ukrina and the lower Bosna; northeastern part is densely forested; it gradually slopes towards the Sava.

- the Trebovec (trig. 618) and the Majeвица (trig. 915) extend along the bank of the Spreča between the Bosna and the Drina; wooded, broken, dropping steeply down to the Spreča and sloping down to the Sava. The spurs of the Majeвица reach the Sava. The Majeвица region with the large Tuzla basin in the south and the Spreča valley is one of the richest terrains in ore in our country; in addition to crude oil, here is the best coal mine of lignite - Kreka, then "Tito's mines" - and of hard coal in Danovici and mines of salt in Tuzla.

The following lowland areas and hollows are very important:

- Posavina, hilly and flat terrain south of the Sava, between the Ukrina and the Drina, ending in the east with Semberija at Bijeljina. This is the most fertile area of the whole Bosnia, well communicative, densely populated, well cultivated, wooded and intersected by streams. Posavina with Semberija is the southern border of the Pannonia Plain. The economic potential of Posavina is increased by the navigability of the Sava along the whole length within this plain. From the north Posavina is protected by the Sava;

- Ljeweč lies between the Vrbas, the Sava and the northeastern slopes of the Kozara; has the same characteristics as Posavina;

- Sprečko Polje, about 70 km long, but narrow (from Tuzla to Doboj) wide from 3 to 4 km, while south of Tuzla the valley is getting broader, altitude above sea level about 200 metres; rich in woods, meadows and pastures. The zone along the river is swampy, flooded in spring and in autumn; well cultivated along the borders. An important highway runs across it from the Bosna valley (the future big railway junction - Doboj) to Tuzla and further on to the Drina valley at Zvornik. The railway line Tuzla - Zvornik is going to be constructed. These communications are a part of a long, important lateral communication which is under construction, running from Belgrade, via Stepejevac, Valjevo, along the Jadar valley, connecting the present railway line from Loznica to Zvornik, and via Tuzla, Doboj, Banjaluka, Bosanski Novi to Karlovac and Zagreb. In this lowland area large units to operate in northeastern Bosnia could concentrate and quarter.

The Bosnian fore-mountains, which at some places reach the right bank of the Sava, can serve at these places as positions for the direct defence and checking the crossing of the Sava from the north, while the mountains southward would make strong and tenacious defence possible.

Conclusion about the Bosnian mountains: These mountains lie in the centre of our country. The highest are in the south dropping gradually northward. The line of extension is north-west-southeast. Due to this, Bosnian rivers, generally flowing from the south to the north, cut them at many places, making defiles and narrow, deeply cut in valleys. Thinly populated to a considerable extent.

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e) Herzegovinian Mountains

These mountains extend between the Neretva, the saddle Ivan, the Zeljeznica and the Bistriča, the Drina, the Sutjeska and Gatačko Polje, Trebinjsko Polje and the Adriatic Sea.

From the sea coast towards inland the terrain elevates, forming several terraces, from which individual ridges, rocks and peaks rise abruptly.

The first terrace extends between the sea coast and the river Trebisnica; the highest peaks reach the height of about 900 metres.

The second terrace extends between the right bank of the river Trebisnica and the line: Stolac - Ljubinje and the Ljubomir lowland area on the one side, and the line Dabarsko Polje - village Fatnica - Bileća, on the other. The main mountain is the Vidusa with the summit Kobilja Glava (trig. 1419).

The third terrace extends between the line Dabarsko Polje - village Fatnica - Bileća and the line Mostar - Nevesinjsko Polje - Gatačko Polje. It begins with the peaks of about 1200 to 1300 metres (the Snikeznica and the Trusina) extending in the mountains: the Velez (trig. 1969), the Bjelasnica (trig. 1867) and the Baba (trig. 1737).

North of the third terrace the following line is formed by the mountains: the Prenj (elevation 2155 m), the Crvanj (trig. 1921), the Mjedena Glava (trig. 1602) and the Lebrsnik (trig. 1985). These mountains are mostly separated from the third terrace by Nevesinjsko Polje and Gatačko Polje and on the other side they reach the upper Neretva.

The last line is formed by the mountains: the Igman (elevation 1502 m), the Bjelasnica (trig. 2067), the Visočica (trig. 1974), the Treskavica (elevation 2088 m), the Leliča (trig. 2032) and the Zelen Gora (trig. 2015).

The surface of the above mentioned four terraces is the purest karst of the Dinaric region. It is almost completely bare; thinly wooded on northeastern slopes. Only the fourth terrace is somewhat better forested. The consequence is that this area is short of water. With the exception of some fields watered by small streams, all streams are dry in summer; springs are very rare. Cross-country movement is very difficult and fatiguing even for infantry.

Most important plateaus and lowland areas are:

- Nevesinjsko Polje with the surface area of 188 square km; 894 metres above sea level; it is about 30 km long and about 10 km wide; fertile and well populated along the borders. This is the largest plateau in Herzegovina. The junction is Nevesinje with second-class highways running to Mostar, Dabarsko Polje, Gacko and Kalinovik; this field is naturally protected from all sides by mountains of medium height;

- Gatačko Polje with the surface area of 62 square km, about 22 km long and about 5 km wide; about 950 metres above sea level; the subterranean stream Musnica flows here; well cultivated and populated along the borders. Localities worth mentioning are: Gacko and Avtovec. A part of the field is periodically flooded in October, November, February and March, but water does not stay more than 10-15 days. The second-class highway from Nevesinje to Trebinje and Niksic runs across Gatačko Polje; it is naturally protected by ridges of mountains of medium height;

- Dabarsko Polje, about 20 km long and about 4 km wide; about 500 metres above sea level. Second-class roads from Nevesinje to Bileća run across it, and

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it forks at Berkovici to Stolac. Naturally protected by the ridges of mountains of medium height:

• Popovo Polje with the surface area of 181 square km, about 30 km long and from 4 to 5 km wide; about 250 metres above sea level. The subterranean river Trebisnica flows across it. The source is at Bileca and it sinks in the western-most part of this field. It is the most fertile hollow in Herzegovina, but it is flooded every year 6-8 months, so that it cannot be cultivated more than 4 months; 75% are corn fields, 15% are pastures, and the rest is unproductive soil. In the middle of it maize and millet are cultivated, and along the borders are vineyards, fig-trees, olive trees, tobacco and other Mediterranean plants. Important communications running across this field are: railway line from the Neretva valley to Trebinje, Dubrovnik and Zelenika. The field is naturally protected by the surrounding ridges of mountains of medium height and low mountains.

The whole of Herzegovina is short of water, especially drinkable water, and in the Popovo Polje area wood is very scarce.

Other fields in Herzegovina are smaller, as for example: Bijelo Polje (north of Mostar, on the left bank of the Neretva), Mostarsko Polje (south of Mostar), Mostarsko Blato and Ljubusko Polje (south of Mostarsko Blato).

All these fields and hollows are very important for the army, for they can serve as suitable, that is the only suitable areas for concentration, quartering and supply of troops. Concentration, quartering and supply out of these fields are next to impossible, for they are surrounded by the region of purest karst.

In addition to these fields there are a number of lowland areas along the lower Neretva and around its mouth. The Neretva valley gets broader from Capljina and these fields are now on the left bank and then on the right bank. This lowland area is mostly swampy terrain, full of lakes, reedy tracts, thus futile and difficult to pass. Mostly marshy parts are Lake Deransko, Svitovsko Blato southeast of Gabela and the tract along the sea coast. In winter time and in spring it is flooded. Along the Neretva valley run important communications - roads and a railway line - from Mostar to Ploce, Dubrovnik, Trebinje and Hercegovni.

The following roads run across the above mentioned terraces:

Ploce - Metkovic - Mostar - Konjic - the Ivan mountain - Sarajevo (second-class highway and railway line),

Slano - village Ravno at Popovo Polje (traffic suspended during floods) - Ljubinje - Stolac - Nevesinje - Kalinovik - Sarajevo and Kalinovik - Foca (second-class road),

Dubrovnik - Trebinje - Bileca - Gacko - Camerno - Foca (second-class road - except from Camerno to Kosman - ordinary road for vehicular traffic).

Lateral communications are:

Metkovic - Dubrovnik - Hercegovni (second-class highway),

Stolac - Ljubinje - Trebinje and Stolac - Bileca (second-class road),

Mostar - Nevesinje - Gacko (second-class highway).

Sea coast from the mouth of the Neretva to Hercegovni is characterized by a specific kind of karst; only in lower regions vine is cultivated and olive trees and maize; in higher regions poor pastures can be found here and there, but the surface is mostly bare.

The four above mentioned terraces are four strong defensive zones for

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checking the advance from the coast inland. Right flanks of these zones border the strong obstacles of the Neretva, and the left the Montenegrin pure karst.

f) Montenegrin Mountains

These mountains cover the area: in the south and southwest; to the sea, the Bejana and Lake Skadar in the southeast; to the Prokletije; in the east: to the upper Lim (to Bijelo Polje) and in the north to the river Ljubovijska and the river Cetina. From Herzegovina mountains it is separated by the furrow: Camerno - Gatacko Polje - Trebinjsko Polje.

In this region we have two sectors separated by the furrow: Gacko - Niksic - the river Zeta - the river Moraca - Lake Skadar. West of this furrow to the sea is the Montenegrin karst, and east are the Montenegrin high mountains.

Montenegrin Karst

This region is a karst plateau which, in fact, is the extension of Herzegovina karst: average height, 1,000 metres. The whole region is short of water, mostly bare, but bush can be found here and there; difficult to pass. Cultivated areas are at Grahovo, Niksic, Cetinje, along the lower Zeta and the Moraca.

The sides of this plateau are steep, rocky, and especially steeply dropping down to Boka Kotorska and the Adriatic Sea.

Mountains and peaks worth mentioning are:

- north of Hercegovini is the Orjen with the summit Orjen (trig. 1895), a wild, rocky and waterless mountain, although with the highest rainfall in Europe (Orkvice, 4,626 mm per year);

- southeast of Boka Kotorska, and directly above Kotor is the Lovcan (trig. 1749), extending southeastward in a rocky ridge to the saddle Sutorman. From this saddle towards Skadar is the Rumijska mountain (trig. 1593) with the saddle Sutorman over which runs the second-class road and railway line Bar - Virpazar. In the southeasternmost part, above Skadar itself, the Rumijska ends with the peak Tarabos (trig. 595).

Montenegrin karst, in connection with Hercegovinian karst terraces, is a strong obstacle to the possible advance from the sea coast deeper inland. Steep shore and ridges along the coast, beginning with Krisosije, the Lovcan and the Rumijska, offer suitable positions for the coastal defence and for checking landing operations, as well as the penetration inland.

Important communications are:

second-class road: Trebinje - Niksic - Titograd,

second-class road: Risan - Trubjela - Niksic,

second-class road: Kotor - Cetinje - Titograd,

second-class road: Njegusi - Danilovgrad in the Zeta valley,

second-class road: Kotor - Budva - Petrovac - Bar - Ulcinj,

second-class road and narrow-gauge railway line: Bar - Virpazar,

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railway line: Trebinje - Bileca - Niksic - Titograd - Flavinca.

This region is characterized by many karst fields and protuberant rocks, caverns and potholes.

Important lowland areas are:

- Mksicko Polje, about 667 metres above sea level, 20 km long and from 12 to 15 km wide which is the source of the river Zeta which sinks in Ozrinici; across this field run the railway line and the second-class road from Bileca to Titograd with the junction at Niksic from where a road forks to Pljevlje. The field is fertile and well populated along the borders; water is available so that quartering and supply of smaller units is possible; it is surrounded by ridges of mountains of medium height; the natural gap is the Zeta valley leading to Titograd;

Grahovsko Polje, about 722 metres above sea level, 5.5 km long and 1 to 2 km wide;

- Cetinjsko Polje, with the junction of roads Cetinje, is of local importance;

- Bjelopavlicko (Zeta) Polje is in the Zeta Valley along which run the railway line and the historical road from Albania to Mksicko Polje and further on through the defile Duga to Gatacko Polje, Mostar and Sarajevo. In fact, this is the valley of the river Zeta which gets broader here and there from 3 to 5 km; it is one of the most productive parts of Montenegro; highly fertile and well populated;

- Titogradsko Polje (Zeta) extends from Titograd to Lake Skadar, in the Moraca Valley, with the altitude above sea level of 65 metres, about 25 km long, and in the south about 30 km wide (looks like a triangle). This plain is the most important in this region. It is suitable for the concentration of troops for operations against Albania; from it to Albania runs a second-class road: Titograd - Tuzi - Skadar. Many communications run convergently to this plain; its southern part, along the shore of Lake Skadar, is periodically flooded.

On both banks of the Bojana the ground is flat, getting wider towards the Adriatic Sea; flooded in winter and in spring; malarial and unhealthy; a third-class road runs across it from Bar to Skadar; and from Ulcinj to Skadar two cart-tracks. The Bojana is navigable for smaller boats.

Montenegrin karst is characterized by a number of small fields and hollows, often aligned one after another, forming fairly deep and long furrows; they are most suitable connection between individual towns and regions. Such furrows extend:

- between Gatacko Polje and Mksicko Polje; known as "Duga"; a horse path runs along it only;

- the furrow between Grahovo, running via village Grab to Cetinje; a good cart-track and a third-class road;

- the furrow leaving the above one at village Dub leading to the Zeta valley at Danilovgrad;

- the furrow extending from Niksic along the valley of the river Gračanica bending over the Prekornice mountain (trig. 1926) from the north and from the east, joining the Zeta valley north of Spuz.

Two long and important furrows in Montenegrin and Herzegovinian karst are:

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- Nevesinjsko Polje - the river Zalomska Reka - Gatacko Polje - the defile Duga - Mksicko Polje - the Zeta valley - Titogradsko Polje and Lake Skadar.

- Popovo Polje - Grahovsko Polje - the Grahovo furrow - Grab - Cetinje - Cetinjsko Polje - Rijeka Crnojevic - Lake Skadar.

These two furrows are natural entrances into Montenegro from the Lake Skadar side and thereby they are very important from the military point of view.

Montenegrin High Mountains

The height of these mountains above sea level is over 2,000 metres; they are rocky; lower parts are forested, while in higher regions pastures of alpine type can be found.

The river Piva, the Tara, the Lim and the Moraca have cut in these mountains deep, narrow, steep and rocky defiles and canyons; due to this, roads do not run along their valleys. The above mentioned rivers have divided the Montenegrin high mountains into three parts:

The western part (on the left bank of the river Piva) is the extension of Herzegovinian mountains the Zelengora and the Lebrnik in the southeastern direction and begins with the karst and high mountain the Volujak and with the summit V. Viteo (trig. 2396) and the mountain Maglic with the summit Maglic (trig. 2386). They continue with the Golija (trig. 1942) and further on south-eastward the Vojnik (trig. 1997), the Stozac (elevation 2227), the Maganik (trig. 2139) and the peak Kamenik (trig. 1784) which steeply drops down in the Moraca.

The central part between the Piva, the Tara and the Moraca are the three mountains; Durmitor, the Treskevac and the Sinjajevina.

Durmitor is a very dissected massif with longitudinal and lateral ridges that steeply drop down into the Tara and the Piva where they form, with the adjacent mountains, defiles and canyons over 1,000 metres deep. The summit is Bobotov Kuk (trig. 2522). Durmitor is difficult to pass, especially in winter; upper plateaus are bare. There is no road in the Durmitor; between the Durmitor and the Sinjajevina there is a third-class road: Niksic - Savnik - Pljevlja; it forks and another third-class road runs to Zabljak. In the northwest the Durmitor slopes down upon a karst plateau in the corner between the Piva and the Tara filled up with the Pivske Planine. South of the Durmitor in the bulge of the river Komarnica extends the karst and bare mountain Treskevac (trig. 2093).

Southeast of the Durmitor extends the Sinjajevina with the summit Jablenov Vrh (trig. 2203). There are no roads in this mountain. Upper regions are bare.

The Sinjajevina is the shortest of wood and water of all Montenegrin mountains.

The eastern part between the Tara on one side, and the upper Lim, the Ljubovijska and the Cetina on the other is filled with the mountains; the Zijovo (elevation 2182), the Komovi (elevation 2434 m), the Bjelasica (elevation 2137 m), the Lisac (elevation 1690 m), the Ljubisnja (trig. 2238) and the peak Plijes (trig. 1717) south of Foca.

In this part most important is the Komovi with the summit Kucki Kom (elevation 2434 m) as the hydrographic centre for the Lim and the Tara. Southeast of the Komovi, in the bulge of the upper Lim, is the high, forested mountain the Visitor (trig. 2210); it is separated from other mountains, drops steeply down in all directions, especially towards Gusinje and Flav.

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In this part of Montenegrin high mountains instead of limestone sands and slate appear. They are rich in humus, rocks are rounded; rich in water and forests. The most difficult to pass and least communicative territory in Montenegro and in the neighbouring area in Herzegovina is the region within the line: Tito-grad - Niksic - Bileca - Gacko - Katinovik - Foca - Pljevlja - Mojkovac - Kolasin - Titograd. This area is over 110 kilometres long from Foca to Titograd, and 60-100 kilometres wide from Niksic, i.e. Bileca to Pljevlja. Only a second and third-class road runs across it from Niksic via Savnik to Pljevlja; besides this, there are only horse paths and footpaths.

In this territory the river Piva, the Tara and the Cetina flow from southeast to northwest, but there are no roads, not even paths, running along their valleys-canyons, so that the valleys of these rivers are not lines of operations, as for example, in Bosnia, valleys of the Una, the Sana, the Brbas and the Bosna.

The region of Montenegrin mountains is of medium height and full of high mountains, of limestone, intersected by deep river valleys, thinly populated, poor communications, difficult to pass, short of water and supplies; owing to this, this region does not offer any favourable condition for operations of strong forces. Only mountain and alpine units can operate here.

In this region there is only one lowland area of great importance, and that is:

- the lowland area around Lake Plav and Gusinje. It is important because it is situated near Albania and can serve for the concentration of smaller units. It is 930 metres above sea level, cut by the upper Lim; surrounded by ridges of high mountains and natural gaps are only in the Lim valley.

Roads and paths worth mentioning are:

Gatecko Polje - Niksic (horse path through the defile Duga) - Titograd,

Bajovo Polje - Niksic (second-class road),

the horse path from the Drina valley from Hum - Savnik - Kolasin, further on to Andrijevice (second-class road),

Niksic - Savnik - Pljevlja (second-class road),

Titograd - Andrijevice - Ivograd, Andrijevice - Pec and Andrijevice - Plav - Gusinje (second-class road),

Titograd - Kolasin - Mojkovac - Bijelo Polje (second-class road).

g) The Prokletije, Metohija and Raska Mountains

The Prokletije

The Prokletije extends from Lake Skadar northeastward along the river Cijevna, then turns eastward to the peak Djaravica (trig. 2656) west of monastery Decani; here it turns northward, over the Bogioevica (elevation 2530 m) and the saddle Cakor extending to the chain of mountains composed of the Hajla (elevation 2400 m), the Zljeb (elevation 2352 m), the Mokra Gora (elevation 2155 m), the Suva Planina (trig. 1750) which surrounds Metohija from the north.

The Prokletije is the southern border of the Dinara system. It is a chain of calciferous mountains, severely wild, pathless and difficult to pass.

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Communications worth mentioning are:

- second-class road Titograd - Tuzi - Skadar,

- horse path from Plav to Selimaj (Albania),

- horse path Gusinke - Seloe (Albania),

- second-class road Andrijevice - Cakor - Pec.

From the military point of view the Prokletije is a strong, strategic mountain, in which only small mountain, most often alpine units, can operate. The Prokletije protects Metohija from the north and northwest.

At the same time, the Prokletije is a strategic partition wall, separating the troops operating east and west of it, for example along the lines of operations: Titograd - Skadar and Kosmet - the valley of the river Drim.

Metohija Mountains

Metohija mountains fill a plateau whose borders are: in the north and northwest: the Prokletije; in the south, the Sar Planina; in the west, mountains extending along the Albanian frontier (the Junicka Planina, the Pastrik); in the east, the river Sitnica and the river Nerodimka.

From this wide and almost round plateau, Metohija, surrounded from almost all sides by high mountains, flow rivers into two seas: the Black Sea (the Ibar with the Sitnica) and the Adriatic Sea (the Beli Drim with its tributaries). The average height above sea level of this plateau is about 550 metres. The chain formed by the southeastern spurs of the Sava Planina (trig. 1750), the Cicavica (trig. 1091), the Crnoljeva (trig. 1177) and the northern spurs of the Sar Planina (the Nerodimka mountain) separates Metohije from Kosovo Polje.

Metohija is fairly wooded, fertile, insufficiently cultivated, thinly populated in the central part, densely populated along its borders. Passable in all directions.

Kosovo Polje extends on both banks of the Sitnica; it is a large lowland area, extending almost the meridian. It begins from Zvecan above Kosovo Mitrovica extending to Kacanicka Klisura in the length of 84 km; it is the widest between Pristina and Dranica - about 18 km. The lowest part lies at the height of about 500 metres above sea level. Across Kosovo Polje runs the so-called "Bosanski put" ("Bosnian road" - not continuous now), connecting Skoplje and Sarajevo. With northern Serbia it is connected by the valleys of the Ibar and the Lab, via Medvedja and via Gnjilane. Besides, there are several second-class roads from Kosovo Polje across Metohija toward Pec, Djakovica and Prizren and further on towards the Albanian frontier. Through Kacanicka Klisura it is connected with the Vardar valley. As it can be seen Kosovo Polje is a big junction of roads running divergently in all directions. It is, therefore, an important strategic object.

Important communications are:

a) On the Kosovo-Metohija plateau;

second-class highway Pec - Kosovska Mitrovica,
second-class road Djakovica - Prizren; this lateral road forks in
Crahovac - Pristina highway,
second-class road Prizren - Suva Reka - Stimlje - Pristina and Stimlje -
Urosevac,
second-class road and railway line Kosovska Mitrovica - Pristina - Urosevac -
Kacanik - Skoplje.

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railway line Pristina - Pec.

b) running to the Kosovo-Metohija plateau:

second-class road Andrijevac - Cakor - Pec,

highway and railway line Kraljevo - Raska - Kosovska Mitrovica,

second-class road and railway line Näs - Prokuplje - Kursumlija -

Pristina,

highway and cart-track Leskovac - Lebane - Medvedje - Pristina,

Urosevac,

second-class road Vranje - Bujanovac - Gnjilane - Pristina and Gnjilane -

second-class road and railway line Skoplje - Kacanik - Urosevac,

second-class road Tetovo - Kacanik - Urosevac,

horse-path Tetovo - the Sar Planina mountain - Prizren,

second-class road Kukes (in Albania) - Prizren,

several horse-paths from Albania towards Djakovica; main paths run over the saddles Gafa Prusit and Gafa Morines.

From the military point of view the Kosovo-Metohija plateau (Kosmet - Kosovo-Metohija) is very important. It is possible to conduct operations from Kosmet along the valley of the Ibar to the valley of the Zapadna Morava, towards Podujevo - Kursumlija - Prokuplje to the Juzna Morava valley and toward Nis, via Gnjilane towards Vranje, through Kacanicka Klisura towards Skoplje, via Djakovica and Prizren to the Drim valley and towards Pec - Cakor to the valley of the upper Lim. So, Kosmet is a maneuvering and strategic area.

Considering the density of population, fertility, communicability and passability, it is suitable for the concentration of large effectives. The easiest way to penetrate to this area is from the east via Gnjilane and Poduljevo; in the west, the weakest line of operation is from Djakovica to Gafa Prusit, which is highly important for Albania, for it runs round the Pastrok and the Koritnik.

Raska Mountains

Raska mountains extend westward to the line: the Cotina, the Ljubovija, the upper Lim; southward to the chain of mountains extending from the saddle Cakor to the Ibar; eastward to the river Ibar and northward to the line: Novi Pazar - Sjenica - the river Uvac to its mouth. This is a narrow zone with two chains of mountains:

- between the Cotina and the Lim extends the bordering chain between Montenegro and Serbia composed of the following mountains: the Kovac Planina (trig. 1533) south of Gajnice, the Gradina Planina (trig. 1446) north of Pljevlje, the peak Kamena Gora (trig. 1483), the Lisa Planina (trig. 1509) north of Bijelo Polje. This chain of mountains is densely forested except the part east of Pljevlje; karst can often be found here and that is the reason for the shortage of water; it is difficult to pass and with poor communications;

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- between the Lim and the Uvac extends a chain of mountains of medium height which begins at Priboj with a narrow, quite wooded ridge extending south of Nova Varos in the mountains: the Zlatar (trig. 1627), the Jadovnik (trig. 1734), the Giljeva Planina (trig. 1499) and the Krstaca (trig. 1755). This chain is bare, with karst here and there, difficult to pass and almost pathless; only a cart-track runs across it: Prijepolje - Sjenica. Slopes dropping down to the river Lim are forested. From the Giljeva Planina extends southeastward a chain of mountains of medium height between the Sjenica lowland area and the plateau Pester; further on is the Jarut mountain (trig. 1428) and at the end the Rogozna mountain (elevation, 1504 m) east of Novi Pazar in the corner between the Raska and the Ibar. This chain is in its western part bare and calciferous; its middle and eastern parts are forested. Passability and communicability: poor; there is only one road: Novi Pazar - Rozaže - Ivangrad.

Raska mountains are wooded, except the central region around Sjenica and Pester which is covered with pastures, so that this area is suitable for cattle breeding (sheep and cheese of Sjenica are famous). Rich forests in the mountains are not exploited because of undeveloped network of communications and the whole region is economically undeveloped; roads are under construction now.

Fields and lowland areas worth mentioning are:

- the Sjenica lowland area (about 1000 metres above sea level), 12 km long, passable for all branches of the army; in summer water is short; swampy along the river Vapa. Climate: continental; winters: severe;

- Pester (from 1200 to 1400 metres above sea level), a plateau mainly bare, calciferous, with subterranean streams; passability: good; terrain: maneuvering;

- the Novi Pazar lowland area, fertile and well cultivated.

Communications in the territory of Raska mountains worth mentioning are:

third-class road Raska - Novi Pazar - Rozaže - Ivangrad;

third-class road Priboj - Prijepolje - Bijelo Polje - Ivangrad,

a good cart-track Kosovska Mitrovica - Novi Pazar (road) - Sjenica (cart-track) - Prijepolje.

h) West Serbian Mountains

These mountains cover the area between the river Drina in the west, the river Sava in the north, the Kolubara, the Ljig, the Dicina, the Ibar and the lower Raska in the east, and in the south up to the line: Novi Pazar - Sjenica - the river Uvac to its mouth.

The river Zapadna Morava and the river Jadar with the Kolubara divide these mountains into northern, southern and fore-mountains.

The southern part - south of the line: Bajina Basta - Titovo Uzice - the Djetinja - the Zapadna Morava - begins with the Zvijezda mountain (trig. 1673) north of Visegrad in the bulge of the Drina; from it southeastward are extending the following mountains: the Tara (trig. 1544), the Zlatibor (Tornik, trig. 1496 and Cigota 1422 m), the Javor (trig. 1520) and the Golija (trig. 1883).

Between the Moravica and the Ibar, north of the Golija extends a wild, forested and high ridge, intersected by deep defiles, which over the Camerno mountain (trig. 1579) ends with the Jelica mountain with the peak Ovar (trig. 985) on the right bank of the Zapadna Morava. The peak Ovar with the peak Kablar (trig. 885) on the left bank form the Ovarska-Kablarska defile in which two big power plants have been constructed. The whole area is unsuitable

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for operations of strong forces except in some lowland areas and valleys that are passable and well cultivated. It is covered by medium mountains, difficult to pass and with poor communications, densely forested especially in eastern and western regions where primeval forests can be found; karst can be found in the western part. The southern part of this area, including the Zlatibor and the Javor is called Stari Vlah. Economic potential for the requirements of larger units is weak.

Lowland areas worth mentioning are:

The Pozega lowland area around Pozega where the Djetinja and the Moravica meet forming the Zapadna Morava. The road and the railway line Visegrad - Titovo Uzice - Pozega - Cacak and the third-class road from Valjevo via Pozega to Ivanjica run across this lowland area.

Main communications are:

second-class road Nova Varos - Cajetina - Titovo Uzice and Nova Varos - Ljubis - Titovo Uzice;

cart-track Sjenica - Ivanjica, and from Ivanjica second-class road Arilje - Pozega; Ivanjica - Guca - Cacak;

second-class road Raska - Kraljevo (along the Ibar valley), a road and a railway line.

As evident, all the roads run from the north southward; there are no lateral roads across the mountains.

The northern part extends from the Zapadna Morava valley to the line: the Jadar, the Kolubara. This area is covered by a main chain of mountains that begins at Loznica and extends in the form of an arch southeastward to the river Ljig; the mountains are: the Gucevo (trig. 779), the Boranja (elev. 881 m), the Jagodna (trig. 940 m), the Sokolske Planina (with the summit Rozanj (trig. 971)), the Poveljen (trig. 1346), the Maljen (trig. 1103) and the Suvoror (elev. 864 m). In the east they are naturally connected with the Rudnik mountain. These are mountains rich in ore of West Serbia and represent a natural extension of the Majevica mountain.

From the military point of view this chain of mountains is a strong strategic obstacle against the advance from the Sava valley to the Zapadna Morava valley. At the same time, in connection with the mountains of the southern part - the Zvijezda and the Tara - it prevents the possible enemy from penetrating from the west across the Drina. Both these roles it played in the war of 1914 and 1915.

Communications running over this chain, and worth mentioning are:

cart-track Ljubovija - Krupanj - Zvornik,

road, cart-track Ljubovija - Pecka and from Pecka to Valjevo second-class

cart-track Rogatica - Valjevo,

cart-track Titovo Uzice - the Poveljen - Valjevo,

second-class road Titovo Uzice - Kosjerici - Valjevo,

Cacak - Gornji Milanovac - the Suvoror - Valjevo (cart-track over the Suvoror).

The fore-mountains (West Serbian fore-mountains) extend in the north up to the line the Jadar - Valjevo - the Kolubara. They are: the Cer (trig. 687), a low mountain, with the Iverak and the Vlasic mountain (trig. 447) extending to village Slovac.

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From the military point of view the Cer and the Vlasic are very good positions for the protection of Valjevo and the Kolubara valley, either from the north or from the south. These mountains played this role in World War I in the Battle of Cer.

Lowland areas worth mentioning are:

- Posavina, extending into Macva and Tammava.

1) Macva is about 30 km long and 34 km wide; situated between the Sava and the Drina; highly fertile and densely populated;

2) Tammava (Kolubara) is about 30 km long and about 10 km wide. It, also, is very fertile and densely populated.

Posavina itself in a limited sense extends along the Sava from village Debrce to Obrenovac (Zabraz).

- the Valjevo lowland area extends to village Divci; second-class road and railway line along the Kolubara valley run across it; fertile and well populated.

These lowland areas, considering their communicability and being protected from the north by the river Sava, can serve as the concentration and quartering area of larger units.

3. The Sar-Pindus System

The borders of this system in the east are: Lake Prespa - the upper Orna Reka - the river Treska - the river Lepenac - the river Nerodimka; in the north: the upper Nerodimka - the river Suva Reka; in the west: the river Topluga to its mouth and then down the Beli Drim to the frontier and the Albanian frontier; in the south: the Albanian and Greek frontier.

This system begins in the north with the Sar Planina mountain and extends straight southward between Lake Ohrid and Lake Prespa across Greece and ends at its southernmost point - Cape Matapan. It is about 700 km long and from 80 to 225 km wide.

The mountains of the Sar-Pindus system extending in our territory are composed of old slates over which limestone can be found here and there, which makes this area considerably different from the Dinara system. The highest peaks of these mountains were covered with glaciers during the glacial period; by their forms (hollow with lakes, sharp and tooth-like peaks, deep and steep defiles) glaciers lend a beautiful scenery to the whole area.

These mountains are very important for economy. Pastures make the development of cattle breeding possible - sheep-farming in Macedonia; water power makes the development of industry possible, and terrain offers excellent conditions for the development of winter sports (Popova Sapka in the Sar Planina mountain). Lowland areas are important, too, because they make the development of intense agriculture and fruit-growing possible by their fertility.

Two parallel chains of mountains extend from the Sar Planina mountain in the direction north-south; they are separated from each other by Lake Ohrid, the valley of the Crni Drim and the valley of the river Radika (right tributary of the Crni Drim).

The eastern chain is formed by the following mountains: the Sar Planina mountain with the peaks: Ljuboten (2449 m), Livadica (elev. 2491 m), Jezerska C, (elev. 2604 m), Bistra (elev. 2640 m), Kobilica (elev. 2526 m) and Titov Vrh (trig. 2702 m). (Trans. note: Titov Vrh is the new name for Turcin which is still on the map). The ridge of the Sar Planina mountain is 80 km long. In the part extending from the saddle Kara Nilola (horse-path Tetovo-Prizren) to

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Mavrovska Polje is the highest and the broadest part of the Sar Planina mountain called the Rudoka mountain with the summit Titov Vrh (trig. 2702). The Sar-Planina is very difficult to pass, wild and mainly bare; its slopes are very steep and forested in the northeast.

Northwest of the main ridge of the Sar-Planina parallel to it between Urosevac and Prizren extends a chain of medium and high mountains: the Narodimka (elev. 1628), the Zar-Planina (trig. 1723) and the Jezerska Planina (trig. 2092); this chain of mountains is connected with the Sar-Planina by the high ridge of the Sar-Planina between Prizren, the Beli Drim and the Albanian frontier extends a ridge of medium mountains, ending with the massif of the Koritnik (trig. 2394). The Koritnik and the massif of the Pastrik (trig. 1989) form the defile through which flows the Beli Drim.

South of the Sar-Planina is the eastern chain of high, calciferous mountains: the Bistra Planina (trig. 2111), the Stogovo (elev. 2273) and the Karaorman (trig. 2242) and the chain of mountains extending from the Bistra Planina southward in the Ilinska Planina (trig. 1909), the Plakenska Planina (trig. 1999), the saddle Bukovo (elev. 1190 m), the Istok Planina (trig. 1661 m) and the Galicica (elev. 2088 m). This last chain of mountains in connection with the Sar-Planina forms the watershed between the Vardar and the Crni Drim; from the Plakenska Planina the watershed extends to the Bigla and the Baba mountain.

The western chain is formed by: the Korab (elev. 2764 m), the Desat (trig. 2375) and the Jablanica (Crni K. trig. 2259) ending at the western shore of Lake Ohrid. The boundary between the PFRJ and Albania runs along this ridge.

Between the upper Vardar and the river Treska extends a chain of mountains southward; it begins with the Zeden mountain (trig. 1260) which blocks the entrance of the Polog lowland area from the northeast; it extends to the calciferous Suva Gora (trig. 1852) and further southward the peak Dobra Voda (trig. 2062) which is connected with the Bistra Planina by the Bukovik mountain. Southernmost, this chain ends with the peaks Kula (elev. 1917) and Konjarnik (trig. 1874).

All above mentioned mountains are partly forested, i.e. their eastern slopes are forested here and there; in higher regions pastures can be found; passability is poor, population thin, few communications, mainly horse-paths running from Polog and the Kicevo lowland area to the valley of the river Treska and Porec lowland area.

Main communications are:

- cart-track Kacanik - Globocica, and from there second-class road to Tetovo - Gostivar - Zirovnica - Debar - Struga - Ohrid,
- second-class road Gostivar - Kicevo - Ohrid,
- second-class road Debar - Kicevo - Brod,
- cart-track Brod - along the Golema Reka valley to village Zdunje,
- railway line Skoplje - Tetovo - Gostivar and further on narrow-gauge line to Kicevo - Ohrid or Struga.

Both the eastern and the western chains are strong positions for the defense of our territory from an attack from the west. Only at Debar is a gap worth mentioning: south of Struga the road runs over the top and the saddle Cafa San (elev. 1234 m), while in other parts only paths in high mountains difficult to pass can be found. Further on in the depth of our territory the following lines of operations are worth mentioning: Debar - Mavrovi Hanovi - Polog; Debar - the Kicevo lowland area - Prilepsko Polje; Strusko Polje - Ohridsko Polje - Bitoljsko Polje.

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Lowlands:

- Polog (Tetovsko Polje), about 50 km long, and 7 km wide; among hollows in this area Polog is very important from the military point of view due to its economic potential. It is all in green in summer time and surrounded by steep slopes of the Sar Planina and the Suva Gora. The bottom is of fertile lake sediments, well watered and the most fertile area in West Macedonia. The undulating foothills of Polog are protected from cold winds offering most favourable conditions for fruit-growing.

Considering the economic wealth and communicability, there are all conditions for quartering and supply of large units. Polog is about 25 km from the frontier and separated from it by high mountains; the only gap is in the north in the Vardar Valley and which connects Polog and Skopsko Polje.

• Strusko Polje and Ohridsko Polje (the Struga and the Ohrid lowland areas) are situated on the northern shore of Lake Ohrid; from the east to the west they are about 20 km long, and from the north to the south they are about 10 km wide; they are separated from each other by the medium spur of the Plakenska Planina; the Crni Drim and its tributary the Sateska flow across the Struga lowland area. Struga is a junction of roads (second-class) running from Debar, Kicevo, Bitolj, Elbasan and Kostur; Struga and Ohrid are connected by a narrow-gauge railway line which, according to a project, will be replaced by a normal track. They are fertile and well cultivated fields, naturally protected by mountain ridges from the east, north and west, and by the lake from the south.

The Struga and the Ohrid lowland areas, considering the fact that they are naturally protected, economically strong and junction of communications, can serve for quartering and supply of large units; the weak point is that the Struga lowland area is near the frontier (about 5 km). Since the southwestern part of the lake belongs to Albania, for the protection of this sector gunboats are required on Lake Ohrid.

- the Kicevo lowland area has a surface of about 43 square km and lies 614 metres above sea level. Easily passable, fertile and with good communications. It can serve as the concentration area for forces to operate on sector Debar. It lies in the middle between Polog, the Debar lowland area, Strusko Polje and Ohridsko Polje and Prilepsko Polje and Bitoljsko Polje with which it is connected by good communications. This circumstance makes the Kicevo lowland area very important from the operational point of view and Kicevo becomes a vital junction of communications. The railway line Prilep - Kicevo is under construction because of rich iron-ore discovered in the vicinity of Kicevo. This line will also be of great importance from the military point of view;

- the Debar lowland area, important junction of roads in the gap towards Albania.

II. MIDDLE ZONE OF OLD MOUNTAINS

AND HOLLOWES

Middle zone of old mountains and hollows is situated between the western and the eastern zone of more recently formed mountains. It begins with the Pannonia Basin in the north, then over its southern border, Sumadije and Pomoravlje, extends in the Rhodope massif in the south. This zone is different from the zones of more recently formed mountains by its geologic composition and relief, for here we have mountains that are remnants of onetime mainland that covered central regions of our country, from Hungary in the north, to Greece in the south. Pannonia massif sank in the north, in the course of long periods of the formation of the earth, forming the vast Pannonia Plain, while the Rhodope massif in the south, on the contrary,

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ridge from the Strumica valley, this brigade met some 60 enemy soldiers in the area of Tumba (trig. 1889); they were dug up at trig 1880 (convergence). Although the brigade was considerably stronger than the enemy, it was unable to take advantage of that, because the ridge of the Belasica is only from 50 to 60 metres broad, so that only a company of the brigade could be deployed on it. The enemy was defeated after all thanks to encircling manoeuvre of small groups on southern and northern slopes.

Lowland areas worth mentioning are

- Kocansko Polje in the Bregalnica valley, between the Osogovske Planine and the Plackovica; about 25 km long and from 8 to 10 km wide, well watered because of rice fields. Across this lowland area runs a second-class road from Bulgaria via Delcevo to Stip, where it forks in two roads: to the Vardar valley - to Titov Veles and to Krivolak. This area is naturally protected by ridges of medium mountains from the north, east and south, and the only gap is the Bregalnica valley towards Stip. Kocansko Polje is well populated only along the borders, i.e., on foothills of the Osogovska Planine and the Plackovica, while the middle is swampy and covered by rice fields.

From the military point of view this field is very important, for it is the junction of all roads running from Bulgaria over the Osogovske Planine. It can serve as the concentration area for the troops to operate along the line of operations: Stip - Kocane - Delcevo - Gornja Dzumaja (the Struma valley) or toward Custendil (Bulgaria - Kjustendil).

- the Pijanec lowland area also lies in the Bregalnica valley around Delcevo; it is small and narrow. Important because it is the junction of two third-class roads that cross the frontier (one from Gornja Dzumaja, another from Custendil); from here a road runs to Pehcevo, Berovo and Strumica, another to Kocane.

- Malesevo lowland area lies around Pehcevo and Berovo (the upper Bregalnica); similarly important as Pijanec. From this lowland area the following roads and paths run: third-class road Berovo - Delcevo - Kocani and Berovo - Strumica; a good cart-track Berovo - Mitrasinci - Vinica - Kocani (running in the southwest round the mountains the Golak and the Bejaz Tepe); horse-path Berovo - Radovis.

- the Strumica lowland area in the Strumica valley; begins from Radovis, where it is called Radovis Polje, then getting somewhat narrower and getting wider north of Strumica, where it is about 10 km wide and getting narrower again towards the frontier. Well watered because of rice fields, well cultivated and populated, with marshes here and there. It is often flooded, and now melioration is being carried out. From the Strumica lowland area a second-class road runs to the Vardar valley via Valandovo, and to the Struma valley along the Strumica valley; a branch runs across the Ograzen mountain to Berovo and Pehcevo; a second-class road runs via Radovis to Stip.

The Strumica lowland area is important because of its vicinity to the frontier, for it can serve for the concentration and quartering of troops. The natural gap is in the east, formed by the Strumica valley, but that gap can be blocked by the positions in the Ograzen and in the Belasica.

- the Dojran lowland area spreads along the shore of Lake Dojran; it is divided between our country and Greece. It lies on an important line along which a railway line runs from Salonika to Istanbul via Seres and along the Struma valley to Gornja Dzumaja. In our part of this plain there is a second-class road from Greece via Valandovo to Strumica, Radovis, Stip, Ovce Polje, Kumanovo and the Moreva valley. This road by-passes the Vardar defiles, runs across ground suitable for manoeuvring and is more suitable for the operations of strong forces than the Vardar valley.

- Ovce Polje, about 300 metres above sea level, lies in the central

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position between Bulgaria, Greece and Albania; it is well populated, but woodless. Important communications run convergently to this area from Kumanovo - Titov Veles - Kocane - Stip and Strumica. This fact gives to Ovce Polje great importance from the operational point of view.

- the Gavgelija-Valandovo lowland area is connected to the Salonika lowland area by the Giganske Klisura; it is situated between Demir Kapija and Giganska Klisura; about 30 km long and from 5 to 6 km wide; this is the lowest area in Macedonia (41-74 metres above sea level), with good communications, woodless and often flooded by the Vardar; important because of international communications running towards the Aegean Sea (Salonika). This is a typical Aegean valley. The natural gap is in the south formed by the Vardar valley, and the smaller one in the northeast via Valandovo formed by the river Anka Reka.

All mountains east of the Vardar are well known from the operations of the Serbian Army against Turkey in 1912, and from the operations of the Bulgarian Army against the Serbian Army in 1913 and 1915, when the Serbian Troops of New Territories (Macedonia) fought bitterly the Bulgarian 2nd Army which advanced to the Vardar valley with the aim of cutting off the retreat of the Serbian Army to Salonika and prevented it from bringing up supplies from Salonika.

In 1941, the Germans broke through the front along the Strumica line of operations, outmanoeuvred mountain positions and quickly invaded the Vardar valley from where they went on advancing down the river.

Mountains west of the Vardar. These mountains extend westward up to the line Lake Prespa - the upper Crna Reka - the river Treska, eastward and northward to the Vardar, and southward to the Greek frontier.

Mountains worth mentioning are:

The Jakupica (Solunska Glava, trig. 2540). This is one of the highest mountains in Macedonia; its middle regions are forested, higher parts are full of pastures; it is very broken and furrowed by the tributaries of the Vardar; by its geographic position and relief it is a strong position for the defence of Skoplje and valleys in the upper Vardar area, and also communications running from the Vardar valley to the Morava valley; its eastern spurs (falling steeply down in the Vardar valley) form the Taor defile which extends from the Titov Veles lowland area to village Taor. From the top knot - Solunska Glava (trig. 2540) - mountains extend in all directions like a star; the Goleznica in the east, the Dautica in the south, the Karadzica in the northwest. The whole massif is poor with communications (horse-paths only) and unsuitable for the operations of large units. By these characteristics, and in connection with the chain of mountains between Polog and the river Treska: the Suva Gora - the Dobra Voda - the Konjarnik - and the deep, narrow and almost pathless valley of the river Treska, this massif does not allow direct operations from the south northward towards the Skoplje lowland area and vice versa, but forces the troops to take the by-pass via Kicevo and Tetovo or the Vardar valley (the retreat of German and Bulgarian forces in 1918; pursuit of Turks by the Serbian Army in 1912 towards Bitolj).

Mountains south of the Jakupica, between the river Babuna, the Crna Reka, the Vardar and Pelagonija (the Prilep and the Bitolj lowland areas) form a separate group. They are medium mountains, bare, except the Babuna which is partially wooded, very broken, difficult to pass and poor with communications. Main mountains are: the Babuna with the peaks Luta (trig. 1499) and Kozjak (trig. 1746); second-class road from Titov Veles to Prilep runs over it (the saddle Prasad); the Klapa (trig. 1149) on the right bank of the Vardar; the Dren Planina, separated from the Babuna by the saddle Pletvar over which runs a third-class road from Prilep to Kavaderci and Negotino.

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The Selecka Planina (trig. 1863) extends as a ridge north-south from Prilep to Brid within the great bulge of the Crna Reka; in the west it borders Bitoljsko Polje, and in the east the Crna Reka. Belongs to lower medium mountains (below 1500 m). It is bare, stony land, with rocky slopes. Eastern slopes, facing the river Crna Reka, are very steep and rocky, while those facing Bitoljsko Polje drop gradually down to the plain. Passable for the units of mountain type; there are only horsepaths and three cart-tracks on it. In the southern part, in the bulge of the Crna Reka, there are traces of roads from World War I. Population only in lower regions.

Between the Crna Reka, the Vardar and the Greek frontier extends the chain of high mountains the Midze and the Kozuf with their northern spurs. The Kozuf and the Midze are high mountains, steep and difficult to pass; the Kozuf (peaks: Dudica - elev. 2050 m, Porta, elev. 2104 m, Zelenbek, elev. 2171 m); the Midze (peaks: Kajmakalan, trig. 2521, Sokol, trig. 1882, Dobro Polje, trig. 1877 and Kozjak, trig. 1814). The slopes of these mountains facing Greece are very steep, while northern slopes drop gradually down, especially towards Kavadarci and Negotino.

The northeastern spur of the Kozuf mountain (Flora, trig. 1727) forms with the Gradeska Planina the defile Demir Kapija on the Vardar. Southeast of the Kozuf mountain (in Greece) extends a spur towards the Vardar which, with the spurs of the Belasica mountain, forms the defile Ciganska Klisura.

Paths are the only communications in these mountains. These mountains are a natural obstacle that makes possible the organization of a defensive zone from the Vardar (at Gavgelije) to Bitoljsko Polje.

The next group is formed by the mountains between Bitoljsko Polje, Lake Prespa and the Resen lowland area: the Baba (the summit Pelister trig. 2600) and the Bigla, extending northward; between them is the saddle Djavet with the road from Bitolj to Resen and Ohrid.

The Baba is a chain of high mountains, bare, stony here and there, rocky, difficult to pass, with poor communications, covered by pastures. The slopes facing Bitoljsko Polje and Lake Prespa are steep.

The area west of Pelagonija to the line Kicevo - Bitolj is covered with a number of medium mountains mutually separated by fairly wide valleys, of various form and direction of extension; mainly wooded, except the peak Luben (trig. 1762). The upper Crna Reka flows between these mountains and divides them into two groups. The northern group: the Baba Sac (trig. 1697) and the Luben (trig. 1762); the southern group: the Buka (trig. 1495) and the ridge northwest of Bitolj between the river Semnica and the river Dragor (battlefield in the Bitolj Battle in 1912). Several good communications - roads and better cart-tracks - run along the valleys extending between these mountains and around them: Bitolj - Resen, Bitolj - Kicevo, Kicevo - Brod - Prilep and others; there are no other communications but horse-paths in these mountains.

Lowland areas worth mentioning are

Pelagonija, formed by the Prilep lowland area in the north and Bitoljsko Polje in the south. It is relatively about 580 metres above sea level; highly fertile and by its climate suitable for cultivation of industrial plants. However, along the Crna Reka the terrain is swampy and unhealthy, so that big works are there now with the aim of regulating the bed of the Crna Reka and draining the ground. The field is woodless; woods can be found only along the western border on the foothills of mountains.

Pelagonija can serve for concentration and quartering of large units. It is naturally open only towards the south where the plain extends into the Larin lowland area. Important junctions in Pelagonija are Bitolj and Prilep from where

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a railway line and roads lead to Greece, towards the Vardar at Titov Veles and Gradsko, towards the Kicevo lowland area and towards the Lake District (Lake Prespa and Lake Ohrid).

The Resen lowland area - north of Lake Prespa, around the town of Resen; bordering in the west the Istok Planina, in the north the Plakenska Planina, in the east the Bigla mountain and the northwestern spurs of the Baba mountain. Fertile, densely populated, with good communications and passable. Swampy in the vicinity of the lake! Communications crossing it: the road Bitolj - the saddle Djavet - Resen - the saddle Bukovo - Ohrid - Struga. From Resen towards the lake run two roads, and the saddle Bukovo - Ohrid - Struga. From Resen towards the lake run two roads, and further on southward, along the eastern shore, a cart-track to Greece, and along the western shore, a road to Albania. Very suitable as the concentration area for smaller units.

The Skoplje lowland area in the Vardar valley. Average height above sea level is 250 metres. Situated between the Skopska Crna Gora in the north and the Sar-Jakupica in the south and bordering the Zeden mountain and the spurs of the Sar-Planina and the Sava Gora in the west; in the east it borders the hilly ridge sloping down from Kumanovo to Katlanovo along the river Poinja. A very important junction of communications is in this area to which roads and railway lines run convergently: from the Morava-Vardar valley, from the north from Serbia, and from the south from Greece, along the Ibar valley, across Kosovo Polje and through Kacanicka Klisura; from Lake Ohrid across the Kicevo lowland area and Polog; from the Bulgarian frontier from Kriva Palanka, via Kumanovo, from Delcevo across Ovce Polje and from Strumica via Stip. The Skoplje lowland area is very important from operational and strategic point of view. The area itself and slopes surrounding it are woodless; the plain is well cultivated, while the central part (east and northeast of the Vardar) is swampy, difficult to pass and with poor communications. There are only a few paths across the marshes. Natural gaps are the valley of the Vardar, the Treska, the Poinja and the Lepenac, but since their valleys are mainly composed of defiles, they can be easily blocked and defended.

The Kumanovo-Presevo lowland area is about 20 km long and about 10 km wide north of Kumanovo, or about 5 km around Presevo; it is narrow at village Lojane. This area is as bare as the Rujen mountain which is in the east of it; well populated mainly along the eastern and western edges and well cultivated. The river Konjarska Reka flows in the middle of it. International communications valley runs to the Kumanovo lowland area. This line of operations has always played a very important role in wars between our country and Bulgaria. Kumanovo is an important junction of communications from where roads run divergently to the Morava valley, to the Skoplje lowland area, to the Vardar valley, to Ovce Polje, to the Bregalnica valley and, finally, along the Kriva Reka to Cusenil.

In 1912, the Serbian and the Turkish armies fought a meeting engagement at Kumanovo, known as the Kumanovo Battle, in which the Turks were defeated.

The Tikves lowland area covers the valley of the middle Vardar and foothills on the right bank from the mouth of the river Crna Reka to Demir Kapija. It is woodless, but due to its specific climate, suitable for the cultivation of some Mediterranean plants, especially sesame, tobacco, etc.

b) Serbian Mountains

These mountains are divided by the rivers: the Velika Morava, the Juzna Morava and the Zapadna Morava into three groups:

The first group between the Juzna Morava in the west and the river Kutinska Reka and the river Luznica in the north, the Bulgarian frontier in the east and the river Kriva Reka in the south. In this territory there are two chains of mountains extending from the south northward, one of them along the Bulgarian frontier, another in the middle, i.e. closer to the Juzna Morava. In the first

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chain of mountains the peaks worth mentioning are: the Biljin with the summit Straza (trig. 1547), the Dukat Planina with the peaks Bele Vode (trig. 1829) and Crnock (trig. 1829), the Miljevska Planina (trig. 1732), the peak Ostrika (trig. 1650), the peak Krvavi Kamen (trig. 1733) and the Gramada (trig. 1719). The second chain is formed by the mountains: the Fetarica (elev. 1806 m), the Besna Kobile (trig. 1922), the V. Streser (trig. 1875), the Cemernik (trig. 1638) with the mine Mackatica, the Ostrozub (trig. 1546), the Krusevica (trig. 912), the Garina (elev. 1057 m) and the Selicevica (trig. 902). The western spurs of this chain fall down steeply to the Juzna Morava valley and, with the Kukavica mountain, form Grdelicka Klisura (the Grdelicka defile) which extends from Vladicin Ham to Grdelica. All these peaks and mountains are forested, intersected by the tributaries of the Juzna Morava and the Struma, difficult to pass, with few communications, and thinly populated.

North and northeast of Kumanovo are: the Rujan Planina (trig. 969), the Kozjak (trig. 1284), the Siroka Planina (elev. 1352 m) and the German Planina (trig. 1388). The Rujan Planina is completely bare, while the northern slopes of the Kozjak are thinly wooded.

The mountains of this group are of great strategic importance, for they protect our vital communications running along the Juzna Morava valley, and the frontier is here closest to these communications (25-30 km). In this part the Bulgarians cut off these communications from Vranje in 1915 during the second day of the war.

Main communications are:

- second-class road Leskovac - Vlasotinci - Piroc,
- cart-track Vlasotinci - Dascani Kladenac,
- cart-track Predeljane - Crna Trava - Dascani Kladenac,
- third-class road Vladicin Ham - Surdulica - Trn,
- third-class road Vranje - Bosiljgrad,
- cart-track Vlasinsko Jezero (an artificial lake - Lake Vlasina) - Bosiljgrad,
- second-class road Kumanovo - Kriva Planka - Custendil,
- second-class road and railway line Nis - Leskovac - Vranje - Kumanovo - Skoplje.

The second group is between the Juzna Morava, the Skoplje lowland area, the Lepenac, the Sitnica, the Ibar and the Zapadna Morava.

Mountains worth mentioning are:

the Skopske Crna Gora with the summit Ramno (trig. 1651); it extends between the Lepenac, the Skoplje lowland area, the Kumanovo Presevo lowland area and the Binecka Morava. It is a ridge about 50 km long, intersected by many small rivers, difficult to pass, low slopes and foothills that are well populated. Its western spurs, together with the Sar-Planina, have formed Kacanicka Klisura (the Kacanick defile). Only paths can be found in it. By its geographic position and relief, and in connection with the Sar-Planina, it blocks the way from the Vardar water system to Kosovo Polje and Metonija, and eastward offers a strong defensive sector.

The Kopaonik extends along the Ibar defile from Kosovo Polje northward to the river Jozanica. It is the highest massif of Serbia with the summit Suvo Rudiste (trig. 2017); it is about 120 km long. The Kopaonik is mainly forested, except in the northern part around Suvo Rudiste and large clearings in

the middle and southern part; intersected and difficult to pass, only with paths, while better roads run around it. Very rich in ore, and in the valleys are many mineral springs. The higher regions of the Kopaonik are an undulated surface, overgrown with thick mountain grass, evergreen forests and pastures. Drinkable water available in large quantities. In the north, to the Zapadna Morava, the Zeljin (trig. 1785), the Goc (trig. 1124) and the Stolovi (trig. 1375). At the bottom of the Goc is Vrnjaska Banja, and at the bottom of the Stolovi is Mataruska Banja. The Kopaonik is a strategic obstacle to the operations conducted east-west, and even a stronger obstacle (together with the river Ibar) to the operations conducted west-east; in operations north-south and vice versa it appears as strong partition wall that separates the forces along the Ibar valley and along the line of operations: Krusevac - Kursumlja - Kosovo Polje. Supported by the Veliki Jastrebac in the east and the Golijska in the west, the Kopaonik is a very strong defensive sector against the penetration from north to south and for the protection of the Kosovo-Metohija area.

The Veliki Jastrebac (elev. 1492 m) and the Mali Jastrebac (trig. 946) extend from the west to the east; thickly forested, intersected by the tributaries of the rivers the Toplica and the Rasinica, difficult to pass, better communications run around them, and only a cart-track over them, over the saddle between the Veliki Jastrebac and the Mali Jastrebac from Djunis to Prokuplje. Through the eastern foothills of the Veliki Jastrebac runs a better road from Blace to the Rasinica valley through Jankova Klisura (Janko's defile). The Veliki Jastrebac and the Mali Jastrebac protect the rich valley of the Toplica with Prokuplje, an important junction; and the Dobric lowland area, from the north. Eastward, the Toplica valley is open and protected by the Juzna Morava to a certain extent.

South of the Toplica to the Binecka Morava and between the Juzna Morava and the Kopaonik and Kosovo Polje are lower medium mountains (1000 - 1400 metres), thickly forested, intersected, difficult to pass, poor communications, thinly populated; the exceptions are individual small hollows and valleys of some small rivers.

Mountains worth mentioning are: the Vidojevica (trig. 1154) and the Pasjaca (trig. 894) which blocks the Toplica valley in the south, and the Radan (trig. 1409).

Between Pristina and Vranje is a chain of medium mountains formed by the Goljak and a number of individual peaks. The chain begins in the west with the Koznica mountain (elev. 1221 m), extending in the Goljak with the peaks: Lisica (trig. 1186), Tepe (trig. 1081) and Kitka (trig. 1154), and then over the peaks Velja Glava (trig. 1181), Orlova C. (elev. 1274 m) and Sv. Ilija (elev. 1270 m). South of the Koznica are the Androvačka Planina (Ostri Vrh (trig. 1040) and the Zegovac (trig. 1071).

Between the Juzna Morava and the river Veternica is the Kukavica, a medium mountain, which, by its eastern slopes and neighbouring mountains the Ostrozub and the Cemernik (both on the right bank of the Juzna Morava) forms Grdelicka Klisura (the Grdelicka defile).

All the mountains of the second group are a series of strong successive defensive positions between the valley of the Ibar and the Juzna Morava. Extension of individual mountains in various directions makes connections of them possible for the organization of good positions for defence against an attack from any side.

Fields and lowland areas worth mentioning

The Gnjilane lowland area - about 500 metres above sea level; woodless, surrounded by forested mountains; easy to pass, with good communications; the shortest way between the Juzna Morava and Kosovo Polje crosses it; Bujanovac - the Konculj defile - Gnjilane - Urosevac.

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Malo Kosovo - the valley of the river Lab; the centre: Podujevo, from 560 to 600 metres above sea level, 16 km long, about 5 km wide, well populated, passable and communicative. Lies on an important line: Nis - Pristina.

The valley of the river Toplica extends along the left bank of the Toplica river and along the slopes of the Veliki Jastrebov. Lies on the important lines: Nis - Pristina and Nis - Prokuplje - Jankove Klisura - Brus - the Ibar valley.

Leskovacko Polje with the junction of communications Keskovac extends from the defile Kurvingrad in the north, which separates it from Nisko Polje, to Grdelicka Klisura in the south. It is fertile, passable and densely populated.

The Vranje lowland area extends from the southern part of Grdelicka Klisura to Bujanovac. It is from 600 to 1500 metres wide and well cultivated; the slopes of surrounding mountains are populated. From this area roads run toward Nis, Skoplje, Lake Vlasina, Bosiljgrad, Kosovo Polje and Medvedje.

The third group covers the area between the Zapadna Morava, the Velika Morava, the Danube, the Sava, the Kolubara, the Ljig and the Dina.

The central mountain of this group is the Rudnik (Veliki Sturjo - elev. 1132 m) which is a natural extension of the Serbian mountains rich in ore (the Gucevo - the Suvobor). From the Rudnik chains of low mountains extend northward to the Danube, eastward to the Velika Morava, southward and southeastward to the Zapadna Morava.

The western and southern spurs of this chain are hills and they cover the whole area between the Kolubara and the Ljig in the west, and the Velika Morava in the east. The tributaries of these rivers flow from the east to the west or reverse (the Rajka, the Lug, the Jasenica, the Lepenica, the Turija, the Kacer) and divide the above mentioned spurs into several zones. The first (northern) zone extends from the Sava and the Danube to the line: the river Rajka - Stepojevaca; the peaks are: Avala (trig. 511), Parcanski Vis (trig. 408); the second zone extends south of the first up to the line: the river Jasenica - the river Lug - the river Turija; the peaks are: Kosmaj (trig. 629) and Varovnica (trig. 405). The third zone extends south of the second up to the line: the river Lepenica - Satornja - the river Kacer; the peaks are: Vencac (trig. 658) and Bukulja (trig. 696). The western part of this territory is covered with many small woods, hedges and orchards which makes observation difficult; the eastern part is less enclosed and the observation is easier. Communicability and passability: good. In rainy weather the terrain is almost impassable and cart-tracks out of use.

These regions of hilly terrain suitable for maneuvering have good communications. In the history of warfare of Serbia they played a significant role in preventing the enemy from advancing towards the Zapadna Morava valley and Kragujevac. In World War I, these spurs on the right bank of the river Kolubara made a stubborn defence of Sumadija against the enemy's advance southward and south-eastward possible, and the spurs on the left bank of the Velika Morava protected Sumadija and Kragujevac from the east and northeast.

South of the Rudnik mountain and west of the river Gruza extends a low mountain, the Kotlenik (elev. 748 m), and between the Gruza and the Velika Morava are the Gledicka Planine (Samar (trig. 922)) and the Juhor (trig. 773).

Important fields and lowland areas

The Cacak lowland area extends from Cacak along the Zapadna Morava valley to Kraljevo; about 30 km long and about 10 km wide. This area is well

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cultivated, densely populated; important junctions of communications are: Cacak in the west and Kraljevo in the east. A railway line and two second-class roads run along this valley from Cacak and Kraljevo along the Zapadna Morava valley to the Velika Morava and Juzna Morava valleys. At Kraljevo the valley of the Zapadna Morava is somewhat narrower and further on eastward gets wider to Trstenik where it suddenly becomes narrower; then it is wider again (the Krusevac lowland area) and narrow again northeast of Krusevac; this defile is the eastern end of the valley of the Zapadna Morava and the only natural connection with the valley of the Velika Morava.

Pomoravlje is the large valley of the lower Velika Morava from Svilajnac to its mouth; about 55 km long and from 12 to 20 km wide. Pomoravlje belongs to the southern border of the Pannonia Plain; it is the most densely populated and best cultivated region in Serbia, with a very high economic potential. The bed of the Velika Morava is not regulated, so that the valley is often flooded. (Trans. note: February and March 1955 the biggest floods for the last 30 years. Last year the level was about 6.5 metres above normal; this year (1955) almost 7 metres. About 50,000 ha flooded this year). No woods except willow groves along both banks; on the hills are orchards and vineyards. Along the right bank of the Velika Morava runs a second-class road from the Danube valley via Pozarevac and Svilajnac to the Juzna Morava valley, and along the left bank a second-class road and railway line from the Danube valley from Belgrade, via Smederevo, Mala Krusna and Velika Plana to the Zapadna Morava valley and the Juzna Morava valley.

In fact Podunavlje is the northern and northeastern side of the ridge which extends from Belgrade to Smederevo between the Danube and the river Rajka. From the broad top of this ridge the terrain drops steeply down to the Danube. The slopes are intersected by many brooks and watersheds, which makes these slopes difficult to pass from Belgrade to Smederevo. Podunavlje is very well cultivated and full of orchards and vineyards; well populated. The main road runs along the foothills, along the Danube, and a cart-track along the ridge itself. Thanks to this ridge the right bank of the Danube on the sector Belgrade - Smederevo is considerably higher than the left (Banat). This ridge is a good position for the protection of Serbia.

THE AREA OF THE PANNONIA PLAIN WITH ITS BORDERS

The Pannonia Plain lies between the spurs of the Alps in the west, the Carpathian mountains in the north and in the east, the mountains of the Dinars system in the southwest and the northern parts of the Rhodope massif in the south. It was formed by the breaking and sinking of the old Pannonia continent. The depression formed in that way was filled with water and was known as the old Pannonia Sea. In the east it reached the Banat mountains and to the steep sectors extending from Golubac and Gornjak via Despotovac to the Bagrdan defile; in the south its border was: the Zeljina, the Stolovi and the Zlatibor, and in the west it reached the foothills of the Alps. Later, the sea became a lake that became smaller and smaller. Finally it disappeared (except some lakes, for example Palić and Balaton) because of the flow off through the Carpathian Mountains (Iron Gates). It is to distinguish: lower parts - Pannonia Plain and higher parts directly around it - its borders. Our country is in possession of southern parts of the Plain (Vojvodina) and borders.

Pannonia Plain

The bottom of the Pannonia Plain, while it was under water, was covered with sea and lake sediments and flat. Later on, limestone, clay, sands and other sediments came above the original surface of the bottom. Its thickness is hundreds

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of metres. The Pannonia Plain is the largest in our country, most fertile and with the highest agricultural potential, so it is the granary of the FPRY. It is very well cultivated and densely populated; small woods can be found here and there (except in the Srem), mainly along the Danube and the Tisa. Thanks to its relief it is passable in all directions in dry weather, but in rainy weather the terrain is difficult to pass (off of roads) even for infantry. It is short of stone and timber, so that construction and repair of roads are difficult. The network of communications is dense, but there are only a few roads with hard surfaces. Big rivers flow across this plain (the Danube, the Drava, the Sava, the Tisa). Their currents are slow; they are winding, forming many bends, backwaters and aits, flooding banks in rainy weather. All bigger rivers are navigable. Dikes are built along many sectors in order to prevent floods.

The Pannonia Plain is composed of:

Banat, east of the river Tisa to the Rumanian frontier; in Rumania part of Banat. In the south it borders the Danube.

Beginning with the narrow frontier sector, it is only 14 km wide. Banat becomes wider and wider southward, because of the extension of the frontier southward; on the Danube it is about 80 km wide. The north-south depth is about 150 km.

Although Banat is, in general, a simple plain, we distinguish a few regions in it, different with regard to passability and relief. The northern half, approximately up to the line Jaga Tomić - Zrenjanin, is a flat plain, easily passable almost the whole year. There are no rivers, but only brooks and drainage ditches. The next region, reaching the line Vrsac - Alibunar in the south and then along the both banks of the Tamis up to the Danube at Pancevo to Pancevački Rit inclusive, is rather swampy; during a very dry season it is passable everywhere, otherwise only in some zones where there are communications. Marshes are west of Vrsac, so-called Vrsacki Ritovi. The Tamis, the Begej and the Brzava, as well as drainage canals and dikes along them are considerable obstacles. The southeastern part of the Banat, between Vrsac, Alibunar, Kovin and Bela Crkva is somewhat higher, in its central part by about 50 metres, than the surrounding plain, and in the south up to 100 metres and is called the Alibunar Greda (Deliblatska Pescara) whose southern part is sandy and fertile. Greater part of the sands is wooded now. The Alibunarska Greda is characterized by steep slopes. Southernmost part, between Vrsac, i.e. Bela Crkva, and the Rumanian border is covered by the farthest spurs of the Carpathian Mountains. Banat is completely open towards Hungary and Rumania.

Backa, between the Tisa and the Danube; along the middle of Backa runs Veliki Kanal from Batina on the Danube to Beoko Gradiste on the Tisa; at village Mali Stapar begins the Mali Kanal running to Novi Sad. In the north, towards Hungary, Backa is wide open.

North of the Veliki Kanal, in the area from village Krnjaja to Vrbas, the terrain is about 20 km higher than that south of the Veliki Kanal and also the tracts along the Danube and the Tisa; it is the Telecka Kosa. It steeply drops down southward to the canal, and in the north it is connected with the Backa Table which covers the whole area between the Danube and the Tisa, except low, swampy tracts along these rivers which are from 5 to 15 km wide. The Backa Table and the Telecka Kosa are characterized by many very long spurs and also by many long shallow holes 2-3 metres deep and 20-30 metres wide.

Srem lies between the Danube and the Sava; in the west its border is east of Ilok, village Sot, village Tovarnik, village Lipovac about 13 km west of Sremska Raca. On the right bank of the Danube is the Fruska Gora (trig. 539), a low mountain, rising in the Pannonia Plain like an island between Vukovar and Slankamen; it is part of the old continent; it is rich in hard coal and marl (northern slopes) used for the production of cement (Beocin). The Fruska Gora is

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forested, but its slopes are cleared and cultivated. In the north and in the east the Srem is protected by the Danube and the Fruska Gora and its eastern spurs.

The rest of the Srem is a plain falling down towards the Sava southward; the northern part of the plain is passable, while the southern part is not so dry, and even swampy along the Sava. There are many drainage canals in the southwestern part between Zemun, Sremska Mitrovica and the Sava. Therefore, that area, in the southwestern part between Kupinovo and Jarak covered with large swampy woods, is unsuitable for broad maneuvering of tank and motorized forces. The southwestern part of the Srem between the Bosut and the Sava is similar: covered with large woods, with many swampy places and without any road with hard surface.

With the exception of the Danube and the Sava, the Bosut is the only obstacle worth mentioning, especially because of its muddiness; it flows from Vinokovci southeastward and pours into the Sava at Bosut.

Otherwise, the Srem has good communication, except through the swampy woods along the river Spacva. The main direction of communication is east-west; double-track railway line, new highway and the old second-class road run in that direction; besides, along the right bank of the Danube, from Sremski Karlovići to Vukovar, runs a road, mainly third-class road. The southern and the northern part of the Srem are connected by the following communications: railway lines: Zemun - Petrovaradin; Sabac - Ruma - Vrdnik; Sremska Raca - Sid - Ilaca - Vukovar; roads: first class highway Zemun - Petrovaradin and three roads over the Fruska Gora (from Ruma, Sremska Mitrovica and Sid). Besides, there are several cart-tracks without a hard surface. The main junction of roads is Ruma. There is no connection with Banat or Backa, except in Novi Sad (only one bridge for both vehicular and railway traffic). In the south, over the Sava, there are the following bridges: at Zemun (for both vehicular and railway traffic), at Sabac (railway bridge, adapted for vehicular traffic, too), at Sremska Mitrovica and at Sremska Raca (for vehicular traffic). (Trans. note: at Sremska Raca - railway bridge). A railway bridge at Ostruznica is under construction.

The Srem is connected to our People's War of Liberation, which proved guerrilla actions, the Srem Front and breakthrough of the same in 1945. This proves that our units fought during the People's War of Liberation successfully and not only in mountainous terrain, but also in frontal combat in the plain against a technically and numerically stronger enemy.

Baranja is the triangle between the Danube, the Drava and the frontier. This large bridgehead is about 30 km long in the middle (Osijek - Knezevo), while the base - the river Drava at its mouth to near Donji Mihaljac - is about 50 km long. The eastern side along the Danube is about 40 km long. The tract along the Danube is swampy, especially in the corner between the Danube and the Drava. The belt on the left bank of the Drava is somewhat drier. Both zones are wooded to a considerable extent. From Beli Manastir to Batina extend from southwest to northeast a series of hills, or the so-called Belomanastirska Greda (elev. 243 m), about 20 km long, and up to 5 km broad. This ridge could be used for the defence of the bridgehead. Visibility is somewhat difficult because of vineyards. The rest of Baranja is a plain, easily passable and communicative. Railway line Osijek - Beli Manastir and further on to Pec is worth mentioning; it forks into railway lines to Batina and Beremend. Besides, there are several narrow-gauge lines. The network of roads is similar to the network of railway lines: the axis is the second-class road Osijek - Beli Manastir and further on to Hungary. It forks into several roads running towards the frontier. Baranja is connected to the rest of our territory by a bridge for vehicular traffic and a railway bridge in Osijek. The approach to these bridges from the north is difficult because of rivers, marshes and dikes.

The relief and high fertility of Pannonia Plain make the movement of all branches of the army possible in all directions (in dry weather); it is suitable for quartering and supply of the largest bodies. Ground features influence combat actions (reconnaissance, security, attack and defence.)

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By their geographic position, their relief along the Danube and further in the south and by impassability, the mountains of this system make the crossing of the Danube from Golubec to Kladovo difficult, and also the possible penetration southward; likewise, they would make difficult our crossing the left bank of the Danube. In the history of national wars of Serbia operations were conducted only from the north to the south in the westernmost part of these mountains. These mountains make the possible penetration from the east towards Pomoravlje difficult, except along the Crna Reka valley which can be blocked and easily defended. In this region (Bor, Majdanpek) there are mines of strategic raw material (gold, copper pyrites).

Fields and lowland areas are:

- Stig with the Mlava in the Mlava valley; it is a long but rather narrow valley which gets very wide along the lower Mlava. This valley is very well cultivated, densely populated, woodless, with good communications. Narrow gauge railroad from Pozarevac to Gornjak (Ladne Vode) and a second-class road to Zagubica, Bor and Zajecar run along this valley. The lowland Stig - Mlava is important, for it is the easiest way to penetrate towards Bor mines from the northwest and to the Zajecar area.

- Branicevo is a valley along the lower Pek; extends from village Ijesnica to the mouth, from 20-22 km, mainly along the left bank of the river Pek. It is about 2 km wide, at village Branicevo it suddenly gets wide joining the Danube valley. Its extension up the river is a still narrower valley - Zvid around Kucevo. Along this valley run the railway line from Pozarevac and the road from Veliko Gradiste to Kucevo and Brodica, towards the important mines of Majdanpek. It is of similar economic importance as Stig, but the valley is somewhat smaller and closed by low mountains in the south. From the military point of view it is of local importance.

Kljuc is situated within the bulge of the Danube, between Kladovo and Brza Palanka. It belongs to the western border of the large Vlaska Plain across which the Danube flows. By its wedge-like form it embraces from the north the westernmost part of the Vlaska Plain, from there leads the shortest way to Krajcova, but first a strong obstacle is to be crossed - the Danube.

- Krajina around Negotin - from Brza Palanka to the Timok - is also a part of the western border of the Vlaska Plain. It is a fertile agricultural and vineyard region, well cultivated and densely populated. Krajina is protected in the east by the Danube to the mouth of the Timok and then by the lower Timok. In hinterland (westward) the terrain becomes elevated extending to the Miroc and the Deli Jovan mountains, both of which are difficult to pass.

6. The Balkan System

The mountains of this system extend from the Carpathian system southward to the line: Nisko Polje - the river Kutinska Reka - the middle part of the river Vlasina - Trn (in Bulgaria). The western borders are the Velika Morava and the Juzna Morava.

The river Nisava divides this mountain system into two groups:

a) The group north of the Nisava. On the right bank of the Timok along the Bulgarian frontier extends the Stara Planina from the Vrska Cuka to the peak Srebrna Glava (trig. 1933) where it leaves our frontier. The summit is Midzor (trig. 2169), and the peaks: Tri Ouke (elev. 1937 m), Tri Kladenca (trig. 1967), and Srebrna Glava (trig. 1933). From the Vrska Cuka the ridge drops down to the Danube gradually extending into hilly terrain.

The slopes of the Stara Planina facing the Nisava and the Timok are partly forested and intersected by deep canyon-line valleys. The western slopes

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fall steeply down into the narrow valleys of the Timok and the Visocica, while towards Bulgaria they gradually drop down to the Bulgarian Podunavlje. This region is thinly populated, with a very weak agricultural potential; there are only a few communications and saddles; the main are: Vrska Cuka, Kadibogaz, Sveti Nikola and the valley of the river Visocica. The frontier line between Yugoslavia and Bulgaria runs along the ridge (to Srebrna Glava). Considering the above mentioned characteristics of slopes on both sides, Bulgaria is in more favourable position with respect to the strength of the frontier line. Nevertheless, the Stara Planina, due to its impassability, protects the valleys of the Nisava and the Timok, and indirectly the Morava valley.

On the left bank of the Timok, mountains worth mentioning, which can serve as good positions are: the Tupiznica (trig. 1162) and the Tresibaba (trig. 787), the Rtanj (trig. 1560), the Devica (elev. 1186 m) and the Svrlijaska Planina (elev. 1344 m), which, together with the Suva Planina (the group south of the Nisava) form the Sioevacka Klisura on the river Nisava, and finally the Samanjac (elev. 853 m) and the Ozren (trig. 1174). In the east is the mountain Vidlic (trig. 1377), between the river Visocica and the Nisava which by its extension parallel to the Nisava valley protects the latter from Pirot to Dimitrovgrad and, together with the spurs of the Greben mountain (south of the Nisava), makes the Nisava valley narrower in the Dimitrovgrad area.

b) The group south of the Nisava. The main ridge is the Suva Planina (trig. 1808) extending between the Nisava, the Kutinska Reka and the Luznica. Southwestern slopes are thinly wooded, steep, rocky and difficult to pass; north-eastern slopes are fairly wooded, also steep and difficult to pass; two spurs run down from them to the Nisava; one from the peak Litica (elev. 1683 m) towards village Spaj (northwest of Bela Palanka), another from the summit Trem (trig. 1808) towards the Sioevacka Klisura which it forms together with the Svrlijaska Planina. Both spurs are strong positions in the Nisava valley.

Other mountains worth mentioning are:

- the Sto with the summit G. Stol (trig. 1239), the Vlaska Planina (trig. 1440), the Greben (trig. 1201) on the frontier, the Crni Vrh (trig. 1461) and the Ruj (trig. 1706) on the frontier.

This group south of the Nisava is very important because it protects, together with the northern group, the main communication running along the Nisava valley to the Juzna Morava valley. There is a number of successive positions which make a successful defence possible.

Main communications in this area are:

second-class road Zajecar - Knjazevac - Piroc,
 second-class road Paracin - Deligrad - Aleksinac - Nis,
 second-class road Paracin - Buljevac - Zajecar,
 second-class road Knjazevac - Soko Banja - Aleksinac,
 second-class road Aleksinac - Svrlijag - Pirot,
 second-class road Knjazevac - Svrlijag - Nis,
 first-class road Nis - Bela Palanka - Pirot,
 second-class road Vlasotinci - Babusnica - Trn (Bulgaria); connected northward to Nis, Bela Palanka and Pirot,
 railway line Zajecar - Knjazevac - Nis,
 railway line Nis - Pirot - Dimitrovgrad.

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Fields and lowland areas are:

- Nisko Polje at the mouth of the Nisava; it is a very important junction of international communications running to Sofia - Istanbul and Salonika - Athens; it is very fertile, well populated, woodless. From all sides naturally protected by the mountains; the gap in the east is the Nisava valley, but being narrow, it can be easily blocked in the vicinity of Sicevo. In the north and in the south there are natural gaps made by the Juzna Morava. The importance of Nis as a junction of communications has always been great. From Nis the ways are open to the Velika Morava and the Morava-Vardar valley and the Toplica valley with communications leading to Kosovo Polje.

- The Bela Palanka and the Pirot lowland areas: both are of similar importance and can be used for the concentration and quartering of large units to operate along the Nisava line of operations.

- the Aleksinac lowland area extends from Djunis in the north to Nisko Polje in the south which it is naturally connected; it is about 5 km wide the valley of the Juzna Morava with Aleksinac (railway station Zitkovac) as the junction of communications. This field is well cultivated and densely populated, with small woods on the surrounding hills. Across this field run international communications to Salonika and Istanbul; it is well protected in the east by the mountains the Ozren and the Kalafat, and natural gaps are only in the Juzna Morava valley.

- Krajina around Knjazevac (the valley of the river Beli Timok) is a lowland area about 22 km long and about 3 km wide with the second-class road and railway line from Knjazevac to Zajecar. This area is thinly wooded, well populated, easy to pass. From this field runs a cart-track over the saddle Kadibogaz to Bulgaria.

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HYDROGRAPHY

General Characteristics

The Federative People's Republic of Yugoslavia is rich in sea and land waters. This wealth is the result of favourable weather conditions, watertight soil in the greater part of the country, woodiness of areas around the springs of our rivers, alpine glaciers in the areas of springs of our big rivers and the possession of the sea-coast in the length of 1,916 km.

The surface layer of the land is composed mainly of clay and other impermeable rocks, so that water flows off on the surface. The exception are karst areas where water sinks in the gaps of limestone formation; there are many underground streams. Most of them are within the Adriatic water system and least within the Aegean water system.

Favourable weather conditions influence, inter alia, the geographic distribution of rainfalls per year and per month. Yugoslavia belongs to those countries that are characterized by a large amount of rainfall. Large amounts of rainfall are in the western mountainous areas of the Alpine and Dinara systems, and small along the middle and lower Vardar, in Pomoravlje and Pannonia Plain.

The water level at the littoral in summer time is very low, especially in the Aegean water system. So, for example, the capacity of the Vardar at high level is 565 cu. metres per second, while during summer low level period it is only 14.2 cu. metres, or 14 times less. After the Danube the Sava is the richest in water; during the high level period in spring and in autumn - its capacity is 4,078 cu. metres per second, and when the level is low during summer months, 668 cu. metres, or 1,120 cu. metres, in average. The Tisa and the Morava come after the Sava. The capacity of the Tisa is about three quarters, and of the Morava 1/16 of the capacity of the Sava for the same period of time.

The capacity of the Danube in the Iron Gates in summer time is five times greater than it receives from the Sava.

Our rivers are very important for our economy.

The Adriatic Sea

The Adriatic Sea is our largest reservoir of water. It was created by the sinking of ground during the later Tertiary, when the process of the forming of the Dinara mountains, the Alps and the Apennines was over. In fact, it is a deep arm of the Mediterranean, separating the Apennine Peninsula from the Balkan Peninsula; in the Strait of Otranto it is only 73 km broad. From the Strait of Otranto to the port of Kaorle (on the Italian North Adriatic Coast), the Adriatic Sea is about 800 km long; it is widest between Omis and Termoli (Italy) - about 200 km; its surface is about 140,000 square km. The depth of the sea varies; in the northwestern part it is very shallow and up to the line Ancona - Pula the depth is less than 50 metres. From this line southward it gets deeper and deeper up to the deepest point (1,223 metres) which is 80 km southwest of Herzegovina. The line: peninsula Peljesac - the islands of Korcula, Lastovo, Palagruze, Pianose, Tremiti and peninsula Gargano is formed of the peaks of an underwater partition-wall, which is, with respect to the depth, the natural boundary. From that line northward the sea is shallow (the deepest point - 266 metres - at the island of Jabuka); south of this partition-wall the depth gets greater rapidly.

Since the Adriatic Sea is part of the Mediterranean, it has all the

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characteristics of it; in the summer time the weather is clear and the sky cloudless, thence it is salt, blue and warm (in depths the temperature is plus 13° C (centigrade), on the surface plus 25° C in average) so that our sea is warmer than the Atlantic Ocean. The difference between the tides is about 0.5 metres, while at some seas it is from 10 to 15 metres. The yearly amount of rainfall along our coastal zone is high due to intense evaporation; vicinity of the Mediterranean and mountains extending along the coast.

The Adriatic Sea contains considerable quantities of salt - 4%, compared to: the Atlantic Ocean - 3.1%, the Black Sea - 1.9%, the Baltic Sea - 0.9%.

Configuration and Dissection of

The Coast

Our coast is very dissected. It is full of bays, inlets, channels, peninsulas and islands. Due to these characteristics it is known in literature as "the Dalmatian type of coast".

Along the greatest part the coast is high and steep, except along the eastern and southern Istria, between Zrmanja and Sibenik, at Split, at the mouth of the Neretva, in Sutorina and Zupa (in Boka Kotorska southeast of Tivat). The line of the depth of 10 metres runs along the very coast, which enables big ships to approach the shore. Slopes of the mountains begin almost everywhere in the immediate vicinity of the coast, their height being from 300 to 1000 metres. They are crossed, except by rare roads, only by bad paths, and besides, the slopes are broken, rocky, very steep, mostly of karst, difficult to pass; in case of small gradients terraces can be found. Movement along these slopes is difficult and slow, and supply with drinkable water and wood difficult almost everywhere. Such is the shore along the Velebit Channel (Littoral Sector) from Omis to 6 km northwest of Ploce, then from Ston to Cavtat, in Boka Kotorska and from Budva to Bar. Along these parts of our coast the defence has many strong positions, and from the peaks observation is easy and visibility good. The defence is strengthened by numerous islands, aligned almost always parallel to the shore; islands obstruct the approach and restrict navigation. Finally, waterless terrain and areas in hinterland almost without any supplies are a very unfavourable zone of operations, and the assailant who would try to land in this sector, would meet difficulties resulting from the topographic and geologic structure of the coast and hinterland and from their small economic and traffic capacity.

The coast is low from Ulcinj to the Bojana; the lowland along the Bojana is flooded in winter time, and besides, unhealthy in summer because of malaria. Along this shore the sea is deep and big ships can approach it.

The whole coast, as well as islands, has many good ports and anchorages. Many small ports and numerous islands are suitable shelters for smaller ships (torpedo boats and submarines). The best harbours with regard to capacity, installations and facilities are: Trieste, Pula, Rijeka, Zadar, Sibenik, Split, Metkovic, Ploce, Gruz, Zelenika, Tivat and Kotor. In addition to these ports, there are 80 ports on the coast and 64 ports in the islands of local importance without modern installations and with short piers,

Fairly large and well protected bays along our coast are: Gulf of Quarnero, Bakar Bay, Paski (at the island of Pag), Sibenik Bay, Kastel Bay (at Split), Gruz Bay and Boka Kotorska.

The islands have the same geomorphologic characteristics as the headland, i.e. karst. Most of them have very dissected coast, steep, with many havens. Almost all of them have peaks very suitable for the observation of the sea. The line of extension of islands is north-west - south-west, i.e. the same as the mainland, whose submerged ridges they are.

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Along the whole length of our coast there are 71 islands populated permanently, 645 small islands which are not populated and 454 rocks also unpopulated.

All islands are divided into two groups: the northern group, in which the biggest are: Krk (408 sq km), Rab (86 sq km), Cres (400 sq km), Losinj (74.5 sq km), Pag (287 sq km), Ugljanj (46 sq km), Pasman (57 sq km) and Dugi Otok (117 sq km); the southern group, in which the bigger islands are: Solta (52 sq km), Brač (396 sq km), Hvar (289 sq km), Vis (86 sq km), Korčula (273 sq km), Mljet (98 sq km) and Lastovo (33 sq km).

The most distant from the coast are the islands of Palagruža and Jabuka, which, according to their geographic position, might be included in the southern group.

Between these two groups (south of Sibenik - where the boundary between them is) and from Dubrovnik to the Bojana there are no islands worth mentioning and the coast is open.

Our islands make the defence of the coast stronger; thanks to their extension parallel to the coast and their elongated form they play the role of advanced positions and outposts preventing the direct approach to the coast. The approach to the coast is restricted to a few channels between islands that can easily be blocked, and at the same time, they make the defender's navigation along the channels by the coast possible. All islands are very good bases for our marines, assault boats and other units which can hinder the activities of the enemy against our coast. But, they can serve to the attacker as jump-off positions (once he takes possession of them) for landing operations on our coast.

During the People's War of Liberation, in addition to landing operations on the islands of Pag, Rab and Cres, landing operations were conducted on the island of Krk (April 1945) by our 26th Division. These landing operations were conducted because of great military importance of the island; it blocks the Gulf of Quarnero and dominates the northern part of the Velebit Channel; it prevents navigation between Senj and Kraljevica, and besides, it was necessary to take that island in order to take Cres and Istria.

There are few peninsulas, and the biggest are: Istria, Pelješac and Lustica (at the entrance of Boka Kotorska).

Along our coast from Bakar to Dubrovnik there are a number of channels extending between the mainland on one side, and islands and peninsulas on the other, or they are straits between individual islands and peninsulas. Worth mentioning are: the Velebit Channel, between the headland and the islands of Krk, Rab, Pag and the northeastern part of the Kotari peninsula, over 100 km long; the Zadar Channel, between the mainland and the island of Ugljan; the Sibenik Channel, between the mainland and the island of Zlarin; the Split Channel, extended into the Brač Channel, between the headland and the islands of Solta and Brač; the Hvar Channel, between the island of Brač and the island of Hvar; the Korčula Channel, between the island of Hvar and the island of Korčula; the Neretva Channel, between the headland and the Pelješac peninsula; the Lastovo Channel, between the island of Korčula and the island of Lastovo and the Mljet Channel, between the Pelješac peninsula and the island of Mljet.

The importance of channels is great in peacetime and in wartime, because they protect ships, make concealed navigation possible and offer favourable conditions for maneuvering, raids, etc.

Navigation along our coast is difficult because of many islands, rocks and shallow places here and there. Due to this, navigation is possible only in zig-zagging channels; some of the channels are unsuitable for big ships, while others are full of rocks, which all requires a sound knowledge of our sea, especially in wartime, when lighthouses must be in the dark. In these circumstances navigation is possible only if every obstacle is known.

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Winds: "bura" (northeast) and "siroko" (southeast) influence navigation, too. "Bura" blows up to 14 days in winter-time; it is a very strong wind; "jugo" ("sirko") blows 3, sometimes, 9 days. In winter-time this wind brings rain, in summer-time oppressive heat. It makes high waves and is dangerous for small ships. "Bura" is more dangerous because of suddenness and strength. Many ports are insufficiently protected from these winds, so that in some of them ships at anchor may become castaways. "Bura" is specially strong in Quarnero, the Velebit Channel, at Sibenik, in the Brač Channel. During a very strong "bura" coastal liners have to stop sailing. Both winds slow down sailing and make the entering and leaving ports difficult.

In summer time strong winds blow seldom. "Maistral" blows most often. It is a refreshing breeze that soothes the heat at the Littoral; it blows from the sea shoreward and begins about 10 o'clock in the morning, blowing till sunset. During the night it is replaced by the wind called "istok" which blows from the land seaward and begins blowing in the evening.

The sea current flows from the southeast northwestward along the very coast. Its depth is from 7 to 8 metres; winds do not influence it. Its speed is 5 km per hour in average.

The share of the Adriatic in our economy is enormous. Fish, sponge, corals, chalk and gypsum can be found there. Sea navigation is very profitable. If we had no sea, we should be cut off from countries overseas as, for example, Hungary, Austria, Czechoslovakia, Switzerland, etc. The sea opens the way to the world, makes possible direct contact with markets abroad. Besides, the Adriatic Sea is of great touristic importance. From Istria to the Montenegrin Littoral there are numerous seaside resorts and tourist objects, where many visitors come from the country and from abroad.

In addition to economic importance, the Adriatic Sea is very important for our country from the political and strategic points of view. The struggle for the Adriatic has been fought 13 centuries and our peoples have remained undefeated.

The main problem of our sea is its connection with the hinterland, construction of communications in the mountains that would have to connect the sea and hinterland, as well as the economic development of the mountainous region itself, and the immediate background first. The Free Territory of Trieste is isolated from the hinterland and will be unable to flourish as long as it is artificially separated and isolated from its geographic background.

If we look at the western coast of the Adriatic Sea that belongs to Italy, we shall see that it is considerably different from our coast, that it has no advantages, but, on the contrary, disadvantages. The Italian coast is not dissected, has no natural bays, no islands, and only one peninsula (Gargano); the sea is fairly shallow along the coast and does not allow the approach of bigger ships. The northwestern part of the coast, from the Trzio Bay to the delta of the Po, is composed of numerous lagoons which makes the approach of ships to the shore difficult and therefore in that part there is only one good port - Venice.

Lakes

Lakes can be found in all parts of Yugoslavia. According to the way in which lake basins are formed, according to their origin, we have: tectonic, glacial, karst and river lakes.

Tectonic Lakes

Tectonic lakes are the largest lakes in our country and most important for the economy. Their basins are lowland areas formed by the dropping of the terrain towards the middle Tertiary; at that time these lowland areas and basins were filled with water.

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Lakes are navigable for small ships.

The largest lakes of this type are in southern Macedonia and Greece. They are:

Lake Ohrid, with the surface area of 348 square km, 285 m deep, 30 km long and 14 km wide; lies at 695 m above sea level. It is supplied with water from springs on the shore and at the bottom. The spring at the monastery of St. Naum is of the greatest capacity. The lake is never frozen. The water of this lake flows off by way of the Crni Drim. Fishing is very developed. Population here live on fishing. Main fishing places and markets are: Struga, Ohrid and Podgradoc. Well known fish are: trout - the best fish in Lake Ohrid, and maybe in the Balkans - then eel and carp.

The southwesternmost part of this lake (about 97 square km) belongs to Albania, and all the rest to Yugoslavia.

Lake Prespa is second by its size (286 square km); 853 m above sea level. It is 54 m deep. In winter time its surface is entirely frozen; sometimes the ice cover is so thick that sleighs can be driven from one side to another. The lake has no visible tributaries or flow-off streams, but undoubtedly its water flows under the Galicica mountain to Lake Ohrid. Lake Prespa, too is rich in fish of the same kind as Lake Ohrid. The greater part belongs to Yugoslavia, and the smaller, the southern part, to Greece and Albania (about 100 square km).

Lake Doiran is about 52 square km large, and about 10 m deep; north-south it is about 9 km long, and about 6 km wide; 148 m above sea level. It is divided between our country and Greece. The smaller part (one-third) belongs to Greece. Supplied with water from springs at the bottom and on the shore. Sometimes the level rises so that the lake floods its shores. In winter time only shallow places along the shore are frozen, the whole surface seldom. Flows off to the Vardar. Very rich in fish.

All these lakes may be important from the military point of view, as they may appear as considerable obstacles or support of flanks. Populated and fertile areas along their shores can be used as concentration areas for large units and, finally, they can be used as lines of communications. All this on condition that navigable combat means are available, in order to prevent the enemy from crossing the lake.

Glacial Lakes

There are very many glacial lakes, but they are the smallest and can be found in those mountains that once were covered with glaciers. Worth mentioning are:

In the Julian Alps area: Lake Bled (1.5 square km, 476 m above sea level), Lake Bohinje (4.5 square km, 526 m above sea level). They are up to 45 m deep. Besides, there are several Triglav lakes. Lake Plav is of the same origin (5.4 square km, 1,007 m above sea level) in the upper Lim area, as well as other smaller lakes in the Montenegrin mountains, in the Prokletije, in the Sar-Planina, the Jakupica, etc. Although they are not very large, they are very deep, water is clear, very cold and greenish. Are of the same importance from the military point of view as tectonic lakes, but are smaller.

Karst Lakes

Many karst fields are under water from autumn till spring, and even till summer; they are periodically flooded fields (Gerknisko Jezero, Livanjsko, Glimocko Polje, Popovo Polje, Mostarsko Blato, etc). Some karst hollows are closed and streams are unable to take water away. They are karst lakes. The level of these lakes rises and falls regularly. They are: Svicko Jezero at Otocac, Plivinsko Jezero at Jajce and Plitvicko Jezera between the Pljesivica and the Mala Kapela.

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Plitvicka Jezera are in the most beautiful part of Croatia; there are 16 lakes; from higher lakes water falls down to lower ones, forming a waterfall of 40 stairs.

Lake Skadar belongs to this group, too; it is the largest lake in our country; in summertime its surface is 370 square km, and in winter time up to 530 square km; the greatest depth is 44 m, and the surface is 6 m above sea level. The southwestern shore is steep because of steep slopes of the Rumijska mountain, while the northern shore is flat and swampy. The Moraca and other smaller rivers flow into this lake, and the Bojana flows off. The lake is rich in fish, especially carp and eel; fishing is well developed on this lake. The lake is navigable, seldom frozen, only its northern part. The level rises and falls; in autumn it rises 2-3 m and water floods lower parts of the shore, so that it is swampy and thinly populated.

Melioration is very important for the economy of Montenegro; it will give about 13,000 ha of new cultivable land that will meet all the requirements of Montenegro in corn and industrial plants.

River Lakes

In our plain and along big rivers there are many river lakes formed in the meanders cut off from rivers and in old river beds. Most of them can be found along the Danube, the Tisa, the lower Drava and other big rivers. Some of them are re-filled with water during floods. Water is then fresh. However, in sluggish lakes water is brackish-alkaline, as for example, Palicko Jezero (4 square km) and Ludasko Jezero at Subotica and Rusanda Jezero (1.52 square km) at Melenci. All the three are mineral (curative) lakes.

These small lakes, too, can influence combat actions to a considerable extent, for they are natural obstacles that generally cannot be crossed without boats, and they are difficult to by-pass, because the surrounding terrain is often swampy and difficult to pass, and sometimes impassable.

Rivers

The rivers of Yugoslavia flow off in three directions: eastward to the Black Sea, southwestward to the Adriatic Sea and southward to the Aegean Sea; accordingly they belong to the Black Sea water system, to the Adriatic Sea water system and to the Aegean Sea water system.

Due to the relief of the terrain (Dalmatian and West Bosnian mountains), the watershed between the Black Sea water system and the Adriatic Sea water system is close to our western frontier, and the watershed between the Black Sea water system and the Aegean Sea water system is closer to the southern frontier of our country. Thus, about 70% of the total area of FPRJ belongs to the Black Sea water system, about 20% to the Adriatic Sea water system and about 10% to the Aegean Sea water system.

The Black Sea Water System

About 70% of the total area of our country belongs to the Black Sea water system. The general characteristics of this water system is that the main rivers, the Danube, the Sava and the Drava flow mainly from the west to the east, and almost all their tributaries join them at right angles, i.e. flow in the direction north-south, or south-north. In case of an action from the north southward or from the south northward, the Danube, the Drava and the Sava are obstacles that might influence operations (combat operations) to a considerable extent, while their tributaries with their own valleys might be lines of operations and communications. In case of an action from the west eastward or from the east westward the roles are exchanged, whereby the Danube, the Sava and the Drava might serve as obstacles and

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supports of flanks, and since they are navigable, they are communications of great capacity.

The Danube

The Danube is the only big river in Europe flowing southeastward. It is the only waterway that connects the central and southeastern parts of Europe, binding them to the Black Sea and straits in it. The Danube is the arterial waterway of Yugoslavia; it enters Yugoslavia 7 km up the stream from village Batina, and leaves it at the mouth of the Timok.

The general direction of the Danube through our country is northwest-southeast with bends in the western and eastern parts of the Fruska Gora (at Vukovar and Sankamen) and east of Belgrade. Up to the mouth of the Drava the bed of the Danube is divided into several backwaters and between them is a number of aits. The direct valley along both banks, especially along the right bank, are zones from 5 to 10 km wide, ready tracts, overgrown with trees. Both banks are low and flat.

From the mouth of the Danube down the river, the right bank is higher. From Vukovar to Belgrade along the right bank extend the spurs of the Fruska Gora, and from Belgrade to Smederevo the furthest northern spurs of the Rhodope mountains. Along this sector, however, the left bank is low and swampy at many places, especially at the mouths of the Tisa and the Tamiš.

Water level. The highest water level is from April to the middle of June (at this time the snow is melting in the Alps).

After the Volga, the Danube is the longest river in Europe; it is 2,860 km long. Across Yugoslav territory it flows in the length of 591 km. From the point where the Danube enters our country north of village Batina to the mouth of the river Nera, or for 368 km, both banks are in possession of our country. The altitude above sea level is 78 m at the mouth of the Drava, 73 m at the mouth of the Sava, and 35 m at the mouth of the Timok.

Width - in average 1000 m, here and there even 2000 m, and along individual sectors it is:

- from the frontier to Novi Sad 500-1000 m and at low water level at some places up to 250 m;

- from Novi Sad to the mouth of the river Karas, southwest of Bela Crkva, about 1000 m;

- in the Mali Kazan and the Veliki Kazan (the Iron Gates) 170-200 m;

- down the river from Sip (northwest of Kladovo) up to 1500 m.

Depth:

- from Bezdán upstream, at low water level, about 20 m, but just a few km downstream the depth is only 4 m;

- at the mouth of the Sava, at low water level, 2-3 m;

- in the Iron Gates there are many places where the depth is 53 m.

Speed

From the Hungarian frontier to the river Karas 0.6-2.5 m/sec; in the Iron Gates it varies; where the width is greater the speed corresponds to the speed in

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the plain, where the river is narrower the speed is from 2 to 5 m/sec; in the Sip Channel it is 5 m/sec.

From Golubac to Sip, or in the length of 100 km, the Danube has penetrated through the southern part of the Carpathian mountains and formed Djerdapaska Klisura (the Iron Gates)(Djerdap). (Trans. note: Djerdap (a Persian word) means whirlpool).

Djerdap is divided into two parts equal in length - the Gornja and the Donja Klisura (the upper and the lower Defile). The first extends from Golubac to Donji Milanovac in the length of 50 km, and the second from Donji Milanovac to Sip also in the length of 50 km. In the lower defile, between the Veliki Strbac and the Mali Strbac, are the Veliki Kazan and the Mali Kazan in the length of 9 km, the narrowest part of Djerdap (170 m). At Sip are Gvozdena Vrata (Zeljezna Vrata - the Iron Gates); this part of the river is full of underwater rocks. At Sip, on our bank, a canal has been made for navigation; it is 2.2 km long, 73 m wide and 3 m deep so that navigation is safe now.

Djerdap is not the same everywhere; the Danube valley is combined of four shorter defiles and three small hollows. The defiles are: Golubacka Klisura (about 7 km east of Golubac), Gospodjin Vir, Kazan and Sipska Klisura and hollows; the Ljupkova, Donji Milanovac and Orsava lowland areas. The walls of the defiles are steep, vertical here and there, rising 300 m, and at some places 500 m above the surface of the Danube.

In the Djerdap defiles, during the high water level period, the current is slow, which makes a lake at Golubac that does not disappear earlier than in May, and which may cause floods on the sectors up the river.

The bed of the Danube in Djerdap varies in width and depth. At Golubac, before the Danube enters the Iron Gates, it is 1600 m wide, and from there in the form of a funnel gets narrow (360 m at the entrance of the defile). In the defiles, where the bed is cut in the resistant rocks, the Danube is very narrow, and in hollows gets rapidly wider. In Veliki Kazan the Danube is squeezed to 170 m and at this place it is up to 53 m deep, and the walls of the defile are almost vertical and up to 500 m high; at Donji Milanovac its width is about 2 km.

The river is often in spate during the melting of snow in our and Austrian mountainous regions in spring, and sometime till June.

From Kladovo the width of the Danube is greater and the depth is up to 30 m. In Rumania, along the left, lower bank, spreads the Vlaska Plain, which is swampy here and there; along our, higher bank, spread the spurs of the Carpathian mountains in Northwestern Serbia, but there are lowlands, too; Kljuc, within the bulge of the Danube, between Kladovo and Brza Palanka, and the lowland area around Negotin.

The Danube is seldom frozen, only here and there, for a shorter period of time, in very cold winters.

During the last fifty years the Danube has frozen several times. The piling up of ice in Djerdap, preventing water to flow off and causing floods up the river is very dangerous. Several times pioneers had to break ice. (Trans. note: The biggest action of the pioneers of the Yugoslav People's Army took place at the end of the winter in 1954, when they prevented floods; floods were avoided in spite of the melting of enormous quantities of snow in Slovenian, Bosnian and Montenegrin mountains.)

Aits in the Danube worth mentioning are: Ratna Ostrva at Novi Sad and Belgrade; then aits at Pancevo, Smederevo, Dubravica, Kostolac, Veliko Gradiste, Golubac, in Kljuc and north of Prahovo. Most of them were used by Germans and Austrians in 1914/15 when they crossed the Danube during the offensive against Serbia.

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There are three bridges across the Danube: at Bogojevo, Novi Sad and Belgrade. The bridges are adapted for both railway and vehicular traffic.

The construction of pontoon bridges across the Danube is difficult because of:

- 1) High vertical waves when winds are blowing, especially "koshava";
- 2) Unsuitable approaches, due to low and swampy banks, or canyon-like valley in Djerdap.

From the economic point of view the Danube is very important for our country, for it is a line of communication for trade with the countries of Eastern and Middle Europe.

The declivity of the river in Djerdap is great. The altitude above sea level is 68 m at the mouth of the Pek, 43 m at Sip, 35 m at the mouth of the Timok; so, the difference is 33 m. The greatest decline is in the Iron Gates: 4.27 m per 1.5 km. Hydroenergy in Djerdap is tremendous. Experts are of the opinion that at the exit of the Danube from Djerdap a power plant of 2,000,000 HP could be built, which means that it would be considerably stronger than "Djeprostraj", the biggest power-plant in Europe with 813,000 HP.

From Orsava down the river to Ada Kale, an ait with 3000 inhabitants (belongs to Rumania).

From the military point of view the Danube is a serious obstacle by its width, depth and quantity of water. At some places the configuration of banks makes this obstacle stronger (swamp waters and defiles, the Fruska Gora and Podunavlje), but, considering the length of the river, the defence is not easy, for the crossing, at the present stage of war technique, is very easy at many places. Due to this, the Danube is not to be considered such a strong obstacle as it was before the last war. Combined Forces of Germans and Austro-Hungarians under the command of General Makenzen crossed the Danube at several places between Belgrade and Ram in 1915. There are several examples from our War of Liberation which prove that even such an obstacle can be crossed. For example, in December 1944 the 36th Division crossed the Danube in gunboats from the left to the right bank between Vukovar and Backa Palanka, whereby the right bank was not only defended by the Germans and the "Ustashi", but along this sector the right bank dominates the left. All other rivers in our country are not strong obstacles (by the quantity of water), except middle and lower parts of the Tisa, the Drava, the Sava, the Velika Morava and the Neretva, especially when they overflow their banks.

The Danube can serve as a first-class line of communications.

The Left Tributaries of the Danube

The Tisa (Tisza, Theiss) enters our country from Hungary south of Szeged and flows into the Danube at Slankamen. Its length is 997 km, of which in our country is 153 km; width about 200 m, and from 4 to 9 m deep. Regulated for navigation, and the valley protected from floods by dikes over 7 m high. In our country it is navigable along the whole length. In spite of melioration that began in 1848, its valley is still full of marshes. The Tisa is a true plain river, with a very small decline, slow and winding current, aits and draining canals. Both banks are low and of the same type, except in the part northwest of Titel, where the Mosorinska Greda (120-130 m) on the right bank of the Tisa is higher than the left bank by 40-50 m. There is only one bridge across the Tisa, at Titel, which is adapted for both railway and vehicular traffic, while the bridge at Senta was demolished in 1941. As evident, the communication between Banat and Backa across the Tisa is very slow.

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The Tisa is connected with the Danube by the Veliki Kanal (Backo Gradiste - Vrbas - Bezdán).

In both Backa and Banat the Tisa is followed by a railway line and a second-class road; in Backa closer to the bank, in Banat at a distance of 10-15 km.

From the military point of view, considering the width, depth and quantity of water, the Tisa represents an obstacle and can make the organization of defence, in connection with the surrounding terrain, easier against the penetration from the east westward and vice versa. The Tisa may serve as both a line of communication and lateral line of operations; besides, its valleys (in a broader sense) may serve for the concentration and quartering of large units, being rich and fertile.

The Tamiš enters our country from Rumania at Jasi Tomić and flows into the Danube at Pancevo. It is regulated for navigation only in its lower part: from the mouth to Pancevo (3 km), and during high water level period up to village Opovo. Not fordable. The Tamiš is an obstacle from Karansebes (in Rumania) to its mouth. Its bed from Kostanj downstream is regulated. Its width is: to Kostanj 20-60 m, and from there to the mouth 30-100 m. The depth: to Pancevo 1-3 m, and further on 3-5 m. Speed of current: small. High water level period in the upper part last from 2 to 3 days, and in the lower part 8 days and even longer. The river floods large areas downstream of Orlovat at the same time when the Danube floods its banks. At some places between the Danube and the Tamiš there are permanent swampy tracts. The southern part, so-called "Pancevački Rit" is reclaimed.

The Karas springs from the Banat mountains in Rumania and flows into the Danube southwest of Bela Crkva. The Karas is an obstacle from Mercina (in Rumania) to its mouth. Its width is from 10 to 50 m, depth from 0.5-2 m. During the high water level period the river floods the whole valley. The valley is from 1500 to 2000 m wide to Grebenac, and further on upstream from 300 to 400 metres, easily passable, downstream to the above mentioned place often marshy.

The Nera also springs from the Banat mountains flowing through Rumania as a big and fast river, which is a considerable obstacle. Its valley along the middle part is canyon-like, but broader in the upper part (the Bozovic lowland area) and in the lower part where it enters our country southeast of Bela Crkva, where it represents the frontier between Yugoslavia and Rumania. It is important as an obstacle and also because of the second-class road running along its valley through the Banat mountains. Through the defile along the middle part of this river there are no communications.

The Right Tributaries of the Danube

The Drava (405 km) enters Yugoslavia at Dravograd. To Maribor it flows through a defile. Followed by the Pohorje along the southern bank and the Kosenjak and the Kozjak along the northern bank, and there the Drava is only 70 m broad. From Maribor on it enters Dravsko Polje, and at Ormoz the lowland area around Varazdin and Cakovec. To Maribor both banks are high, and in Dravsko Polje the left bank is higher from Ormoz to Cakovec, for the spurs of the Slovenske Gorice slope down to the river. From the mouth on its left tributary the Mura - 7 km southeast of Kotoriba - to Donji Miholjac, the Drava mainly represents the frontier line between Yugoslavia and Hungary and a fairly strong obstacle. From Donji Miholjac down the river both banks belong to Yugoslavia. From Barc to its mouth the Drava is regulated for navigation, but practically navigation functions only from Cadjavia to its mouth (105 km). Down to the Varazdin lowland area the river has no backwaters. Its valley farther on is sandy and undulated, here and there swampy and full of reedy tracts, backwaters and aits. The right bank is higher than the left everywhere except at Legrad, where on the left bank the hills are on the very bank. The approach to the river in this part is possible only along communications. In spring the country is flooded.

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Water level:

The highest water level is from the end of April till the middle of June; the lowest from December till February and from August till October.

Width:

- From Dravograd to Maribor 100 m in average (low water level);
- From Maribor to the mouth of the Mura from 60 to 160 m;
- From the mouth of the Mura to the mouth of the Drava 300 m (low water level; up to 600 m (high water level).

The depth of an average water level:

- From Dravograd to Maribor 3 m;
- From Maribor to the mouth of the Mura 3.5 m;
- From the mouth of the Mura to the mouth of the Drava 4.5 m.

The speed of the current:

- During the high water level period 1.5-2.2 m/sec;
- During the medium water level period 1.2-1.5 m/sec;
- During the low water level period 0.6-1.2 m/sec.

There are no fords in the Drava. There are a number of railway bridges and bridges for vehicular traffic; railway bridges are on the railway line Dravograd - Lobot, Pragersko - Maribor, Pragersko - Ptuj, Varazdin - Cakovec, Koprivnica - Gyekenese, Virovitica - Barc, Podravska Slatina - Selje, Osijek - Beli Monastir; bridges for vehicular traffic are at: Dravograd, Vuzenica, Vuhred, Brezno, Maribor, Ptuj, Ormoz, Varazdin, Barc, Donji Miholjac, Osijek. At Barc, Cadjavia and Donji Miholjac the bridges were demolished during World War II so that they are out of use.

From the military point of view the river Drava is a serious obstacle by its width, depth and speed of current, as well as by the configuration of its banks. The importance of this obstacle is especially great from the mouth of the Mura (Legrad) to Donji Miholjac, where this river is the frontier line between Hungary and Yugoslavia.

From Cadjavia downstream it can be used as a line of communication, since it is navigable along this sector.

Of the tributaries of the river Drava, its left tributary, the Mura, is worth mentioning. It represents the frontier between our country and Austria from Spilj (Spielhof) to Radgona, and between Hungary and our country along its lower part northeast of Cakovec to the mouth at Legrad.

It is up to 150 m wide, very fast and has low banks.

The valley of the Mura is wide, fertile and densely populated.

The bridges across the Mura are: at Spilj (in Austria) railway bridge and bridge for vehicular traffic, at Omurek (Murek - in Austria) a bridge for vehicular traffic, at Verzej (both), south of Hotiza a bridge for vehicular traffic, at Mursko Sredisce (both), on the road Gorican - Latenje (in Hungary) a bridge for vehicular traffic, east of Kotoriba a railway bridge.

From the military point of view the Mura, in connection with the northern

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spurs of the Slovenske Gorice, represents a strong frontier line between Spilj and Radgona.

The right tributary of the Drava, the river Mislinja, flows into the Drava at Dravograd. Its valley, in connection with the valley of the river Savinja, makes operations possible along the line of operations: Celje - Dravograd - the valley of the river Labotnica (Austria).

The Sava (total length 940 km - our longest river). Formed by two rivers: the Sava Dolinka, which springs at Ratece, and the Sava Bohinjka, which flows off from Lake Bohinje. These two rivers join each other at Radovljica, from where the Sava flows across Radovljicko Polje, Kranjsko Polje and Ljubljansko Polje, and after that it enters at village Kresnica a long defile which it leaves at Krsko. Now comes the Krsko-Brezice lowland area at the mouth of the river Krka. From Zagreb downstream to its mouth at Belgrade the Sava flows across a plain. The width of the river upstream of Ljubljana is up to 100 m, downstream to Zagreb 100-150 m, and further on from 250 to 500 m.

The depth at Brezice 2.9 m, at Zagreb 4.1 m, and from Sisak to the mouth 7-8 m in average.

Speed of current: to village Rugvica (about 20 km east of Zagreb) is great, downstream of village Rugvica it is moderate, and from Sisak on - low. It is during the medium water level period along the sector Brezice - Rugvica 1.5-2.7 m/sec; from village Rugvica to Sisak 1-1.2 m/sec, from Sisak to the mouth it does not exceed 1 m/sec.

High water level period generally comes after the melting of snow in March or April, and exceptionally earlier (December 1952 when the Sava unexpectedly flooded Posavina), seldom in October and November after long and heavy rainfalls. The high water level period lasts from 10 to 12 days.

Floods in valleys are the result of high water level almost every year, and occasionally several times in the same year. Downstream from Zagreb floods may cover enormous large regions. Floods deteriorate communications in Posavina.

The approaches to the river are bad, primitive, and during a rainy period and after high level period need repairs or even reconstruction. Every approach must be reconnoitred before crossing, especially during the high water level period when, due to the fact that the banks are flooded, one must reckon with serious difficulties during the crossing.

From Radovljica the Sava is an obstacle by the quantity of water and by its high banks, that are deeply cut in to the mouth of the river Sora. From Ljubljansko Polje to Krsko Polje the Sava is an obstacle not only because of the quantity of water, but also because of difficult approach to its banks in the defile. This was proved by the following example: during the People's War of Liberation, in January 1945, the 14th "Slovenia" Division, operating within the Sava area (east of Litijska), was unable to cross the Sava from the left of the right bank in spite of the fact that it had boats, because of waves caused by the current and uneven bottom of the river bed. Further on downstream, in addition to the quantity of water, marshes and woods makes this river a bigger obstacle, especially from Zagreb to the mouth of the river Una at Jasenovac, and also along the left bank in Slavonia and Srem. In spring low banks are generally flooded and then the Sava is a serious obstacle. The Sava is navigable from Sisak (592km). The project is to make it navigable to Zagreb (Podsused). During the lowest water level period navigation is suspended entirely.

Important bridges are at: Ljubljana, Litijska, Ratece, Sevnice, Zagreb, Sisak, Jasenovac, Bosanska Gradiska, Slavonski Brod, Samac, Brcko, Sabac and Belgrade (railway and vehicular traffic). Construction and maintenance of pontoon

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bridges across the Sava are coupled with similar difficulties as on the Danube. The Sava is the biggest tributary of the Danube in our country and our biggest internal river. It connects the region of the Alps with the Danube Basin and Pomoravlje, and by means of its right tributaries the Dinara region and the Littoral with Podunavlje. Ljubljana, Zagreb and Belgrade are situated on it.

From the military point of view the river Sava is a serious obstacle by the quantity of water, depth and length, as well as by the considerable width of its swampy valley. Its valley could serve as a basis for operations southward or northward and also as the line of operations for the advance from the west eastward and vice versa.

Densely populated and economically strong, the valley can be used for quartering army masses.

Due to the above mentioned connections between its valley and individual regions, it is possible to transfer operations from one region into another; besides, the Sava valley can serve as a first-class lateral line of operations.

The Germans and Austro-Hungarians under the command of General Makenzen crossed the Sava at several places along the sector from the mouth of the Drina to Belgrade in 1915.

The left tributaries of the Sava

The Kokra is a small river with deeply cut bed. It is important because along its valley runs a second-class road connecting Kranj and Velikovac (in Austria) via Jezerski Vrh.

The Savinja spring between the Kamnisk Planine and the Savinjske Alpe, flows along a narrow valley to the provincial town of Breslovca, where it enters the Celje lowland area; at Celje it bends southward, entering a defile again, and flows into the Sava at Zidani Most.

The Savinja is an obstacle from Celje to its mouth by the profile of its valley; it is a typical mountainous river that winds along narrow valleys. Due to a great declivity (about 41 m per 23 km), the speed of its current is great, and at many places the river is dangerous for bridges during the high water level period. The height of the banks is different; upstream of Celje the right bank is from 3 to 5 m high in average, and the left is lower and broken; at Zidani Most the river is cut in the steep slopes. Its width is from 70 to 100 m, and downstream at Rimske Toplice 40-50 m here and there. The depth varies: during the low water level period it is 1.5 m, and during the high water level period it is from 1.5 to 6 m. The river seldom floods its banks, and then only lower parts. The Savinja is not navigable, but is busy with raft traffic.

The importance of the Savinja lies in the fact that the main railway double-track line with Zidani Most and Celje, Maribor and Austria runs along its valley, and also other communications from Celje to Austria.

The Sutla is a small river with a road from the Brezice lowland area northward to Dravsko Polje; it is the boundary between FR Croatia and Slovenia.

The Lonja (132 km) spring from the Kalnicko Gorje; its tributaries are the Ozma and the Illova which springs from the foothills of the Bilo Gora. All the three are typical plain rivers with slow and winding currents; they often flood the country. These three rivers receive water from a number of streams and brooks from the territory surrounded by the Medvednica, the Kalnicko Gorje, the Bilo Gora, the Papuk and the Psunj. The lower Lonja flows across Lonjsko Polje which is swampy here and there.

The Orliava is a small river flowing across the Slavonska Pozega lowland

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area; communications run to this area along the Orpljava valley.

The Bosut (186 km) springs south of Vihkovi, flows through this town and joins the Sava at village Bosut (5 km north of the mouth of the Drina); it is an obstacle from village Podgradje to its mouth because of muddy bottom and swampy banks. Its bed is deeply cut in, declivity insignificant, bottom very muddy. Its banks are from 2 to 7 m high, steep and wooded; only downstream at Morovic they are not steep and are approachable; composed of hard clay, at the mouth mostly steep and broken. Width: 45-55 m, and between villages Apseveci and Morovic 150 m here and there. The depth is during the low water level period to village Apseveci 0.5-1.5 m, further on to village Morovic 1.5-2 m, and from there to the mouth about 2 m. During the high water level period from 4 to 7 m. During droughts the bed is entirely dry at many places; only stagnant water can be found then. Floods cover large areas.

The right tributaries of the Sava

The Sora springs between the Alps and the Dinara karst. It is a mountainous river, but at Skofja Loka its valley gets wider in the Kranj lowland area. It is very important for second-class roads run along its valley and along the valley of its tributaries from Skofja Loka, across the saddles at Podbrdo, Cerklno and through village Zari to the valleys of the Idrija and the Soča.

The Ljubljanka springs from the western slopes of the Pivka mountain (at Ilirska Bistrica) under the name of the Pivka. Flows northward and at Postojna sinks into the Postojna Cave. At Planina it appears again under the name of the Unec, flows for about 10 km, sinks again and, finally, appears again as the Ljubljanka at Vrgnika. Further on, it flows across the large, fertile and partially swampy Ljubljansko Barje and through Ljubljana itself; downstream of Ljubljana it joins the Sava.

The Ljubljanka is an obstacle from Vrhnika. Both banks are followed by stairs 3-6 m high, along the upper part close to the river, along the lower part running along the river at a distance from 150 to 250 m. The lower part is winding. In Ljubljansko Barje the banks are low, in Ljubljana retained by walls, and further on downstream filled with sand and pebbles. Its width is from 30 to 70 m. Depth: at low water level 1-2 m, medium 1.6-2.8 m, high water level period: 2.7-4m. The river floods Ljubljansko Barje every year and sometimes twice a year.

The Krka springs from karst at village Krka southeast of the Ljubljana lowland area. Its valley is fairly wide, becoming considerably wider from Novo Mesto. The lower Krka flows across the Krsko-Brezice lowland area and joins the Sava at Brezice. The Krka is an obstacle from its spring to village Dvor because of its rocky banks deeply cut in, and further on downstream because of the quantity of water, too. Before it enters Krsko Polje west of Novo Mesto, the bed of the Krka is deeply cut between high, partly rocky and unapproachable banks. Downstream from Novo Mesto to the mouth the bed is wider and winding, and at the mouth it is somewhat muddy. In Krsko Polje the banks are low, overgrown with trees and flooded. The width is fairly constant: 65 to 120 m. But the depth varies: 1.3-6.4 m. High water level periods are frequent, appearing every spring, and even in June and October, and last quite long. At that time a large area in Krsko Polje is under water which is from 1 to 2 m deep at some places. In normal circumstances this river is fordable at some places.

It is important because along its valley run roads connecting the Krsko-Brezice lowland area and the Ljubljana lowland area in the Sava valley; these roads by-pass the long defile on the Sava between Ljubljana, Zidani Most and Krsko.

The Kupa springs from the spurs of the Risnjak. To the Karlovač lowland area it flows along a narrow valley which is somewhat broader at Crnomelj and Metlika. At Petrinja the Kupa enters the swampy plain of the Sava and at Sisak flows into the Sava. It is navigable only during the high water level period in the

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length of 130 km (from Karlovac to the mouth), and at normal water level only from village Pokupsko.

By the quantity of water the Kupa is an obstacle along the whole length. In plains the bed is winding. In the upper part the river is pressed by surrounding hills; the current is fast because of underwater rocks. In average, its banks are from 5 to 8 m high and quite broken. Along the sector village Brkisevina (towards Glina) - the mouth, the approach to the banks is difficult because of muddy terrain and often is confined to existing communications. The width is from 100 to 190 m. The depth is 3-5 m at Sisak during the low water level period. Water level varies. During the high water level period the country is flooded, often twice a year; then, fairly large areas at Metlika, in the Karlovac lowlands and in Posavina are flooded. Water flows off very slowly, and remains here and there for months.

The right tributaries of the Kupa worth mentioning are: the Dobra, the Korana, on which Karlovac is situated, with its tributary the Mreznica, and the Glina. The beds of all these rivers are very narrow and deeply cut in rocks, especially in upper parts, so they are considerable obstacles like the Kupa.

The Kupa is very important because of communications that run along the shortest way into the Sava valley downstream of Zagreb. Along the valleys of the tributaries of the Kupa run roads connecting the Kupa and the Sava valleys to Lika and northwestern Bosnia.

The Una (255 km) springs 5 km south of village Donji Srb. Flows into the Sava at Jasenovac. It flows across various regions of the Dinara system; its valley connects the Sava valley and the region of North Dalmatia and the Adriatic Sea (the Una railway line).

In the main, the Una valley is narrow, with defiles in some places; it is wider at Kulen Vakuf, Bihac, Bosanska Krupa and Bosanski Novi. From Kostajnica the valley is about 1 km wide; at Dubica it enters the Sava valley and flows across marshy ground which is difficult to pass. The Una is an obstacle from Bosanski Novi to its mouth. The bed is not regulated. The banks are from 2 to 5 m high, of earth and broken, retained by a wall at few places, thickly overgrown with bushes - easy to approach. Width: 80-175 m. Depth: variable, in average in normal water level 2-4 m. In exceptional cases, during the high water level period the river floods its banks, but floods do not endanger lines of communications that run along both banks. Only at the mouth the floods of the Una join those of the Sava. Downstream of Bihac there are very few fords. Small barges can navigate up to Bosanski Novi and up the river Sana, a tributary of the Una, to Projedor.

A second-class road and the so-called Una railway line run along the Una valley, connecting (via Bihac and Knin) the Sava valley to Sibenik and Split, and reverse, the Adriatic Sea to northwestern Bosnia and the Sava valley. Owing to this, the Una valley is of first-class importance from the economic, traffic and military point of view.

Its tributary the Sana is worth mentioning; it is an obstacle from Prejedor to its mouth by its width (75-130 m) and by its depth (1.5 to 3.5 m). Its banks are broken, 2-3 m high, thickly overgrown and difficult to approach.

The Vrbas (240 km) springs from the foothills of the Vranica mountain. The Vrbas valley is narrow, with steep, rocky and craggy sides. Between Gornji Vakuf and Donji Vakuf the valley is wide, known as Skoplje, a lowland area 30 km long and 5 km wide; Skoplje is one of the most fertile and most densely populated lowland areas in Bosnia. North of Banjaluka the valley gets wider and gradually spreads into a fertile lowland area called Lijevoe which extends into the swampy Sava valley.

The Vrbas has the characteristics of a mountainous river even in a plain. Its bed is not regulated, but left to the influence of natural forces and

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gives the impression of wildness. Numerous backwaters, full of water even in dry summer months, up to 1 m deep, make often impossible the discovery of the original bed. The delivity is considerable, about 0.12 m per km. The banks are from 2 to 7 m high, of earth, broken, thickly overgrown with bushes and difficult to approach along the whole length. In the original bed and in backwaters are numerous aits, some of them cultivated. The width of main current during the normal water level period is 65-110 m, and the width of parallel backwaters 10-40 m. During the normal water level period the depth is 1.5-3 m, and in backwaters up to 1.5 m. Speed of current is 1-1.5 m/sec in normal circumstances. Floods are normal phenomena in spring and in autumn, when the ground is covered with water from 1 to 1.2 m deep. In some places water remains one or two months and during that period cart-tracks are out of use for heavy vehicles; practically unserviceable for transportation.

From Banjaluka only rafts can navigate.

A second-class road runs from Gornji Vakuf along the Vrbas valley to its mouth northwest of Srbac, and from Gornji Vakuf to Jajce also a narrow-gauged railway line. From Donji Vakuf to Banjaluka the valley is narrow and canyon-like, but a little wider at Jajce; in this part, the valley can be easily blocked and defended. Along the Vrbas valley there are some rich agricultural areas: Skoplje and Lijevoaj; in those areas all supplies for men and animals are available, as well as material for engineering works. In that part where the valley is a defile, Jajce is an important economic centre. However, even in the valley between Donji Vakuf and Banjaluka some wider places with localities can be found in which supplies for smaller units are available.

From the military point of view the Vrbas valley is a line of operations, in the direction north-south, extending via the Prozor saddle and along the Rama valley into the Neretva valley and to the Adriatic Sea.

During the Fourth Offensive in 1943, in the period of "Weiss II" Operations, the German 717 Division advanced along the Vrbas valley, along the general line of operations: Jajce, Donji Vakuf, Bugojno, Gornji Vakuf, Prozor, with the aim of encircling our forces within the bulge of the Neretva (in cooperation with forces advancing along other lines of operations). The enemy failed.

The Bosna (308 km) springs west of Sarajevo from many (30-40) springs in the foothills of the Igman mountain. At the very beginning it is a strong and fairly broad river. Its valley is variable: now wide as in Sarajevsko Polje, Zenicko Polje, Zepcansko Polje and Dobojsko Polje, and then narrow: the narrowest place is at Vranduk. Fertile and well cultivated along the whole length. At Modric the Bosna enters Posavina, and at Samac flows into the Sava. Not so fast as the Vrbas and with smaller delivity. The Bosna is an obstacle from Maglaj to its mouth. The valley looks wild at some places. From Doboaj downstream it forks into several branches. Numerous swampy backwaters are separated from the main current by gravel. The delivity is small, about 0.8 m per km. The banks are from 2 to 6 m high, broken, overgrown with trees and bushes and easy to approach during dry weather periods. Now one bank is higher, then another. Down to Doboaj aits are small and uncultivated, from there downstream they are larger and well cultivated. The width of the river varies, from 80 to 185 m. Narrow places are between Maglaj and Doboaj. During the normal water level period the depth is from 3 to 6 m, and in backwaters up to 2 m. The river floods the country in spring and autumn every year. It seldom floods the country between Maglaj and Doboaj, but further on down to Modric more often. Downstream of Modric is an area 4 km wide, generally flooded every year, from which water flows off after floods in 14 to 18 days. The river is not navigable for ships, but lumbering and floating trade is highly developed. Even when the water level is normal, fords are rare; there are several bridges. In addition to the old narrow-gauged railway line Brod - Sarajevo, the new normal-track railway line Samac - Sarajevo has been constructed in the valley of the Bosna.

From the military point of view the Bosna is the most important of all rivers in Bosnia. Its valley is comparatively most suitable for operations; besides it connects some regions very important from the economic point of view and Sarajevo,

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a vital junction of communications, from where a good communication runs divergently in all directions. Via the Ivan saddle it is connected with the Neretva valley. The Bosna valley, along the valleys of its tributaries the Usora and the Lasva, is in connection with the Vrbas valley, and along the valleys of the Spreca and the Krivaja, with the Drina valley, which makes possible maneuvering and regrouping of forces from one line of operations to another.

During the Fourth Offensive in 1943, in the period of the "Weiss II" Operation, from the upper Bosna region (Sarajevo area) operated the German 718th Division along the general lines of operations: Sarajevo, the Ivan saddle, Konjic with the aim of encircling our forces in the bulge of the Neretva (in cooperation with forces operating along other lines of operations). The enemy failed.

The Bosna is the biggest Bosnian river! Besides, its valley is the widest, most fertile and, naturally, most densely populated of all other valleys in Bosnia! In its valley are situated many towns and vital basins of strategic raw material (iron, coal) and basins of our heavy industry (Zenica), with the main junction of railway lines - Doboaj.

The Drina (333 km) together with the Tara (467 km) is formed by two fast, mountainous rivers, rich in water from the very source: the Tara (134 km) and the Piva (88 km). The Tara springs from the northern slopes of the Zijovo mountain, and the Piva at Piva Monastery. The sides of their valleys are steep and rocky (the Piva 500-700 m high, the Tara up to 1000 m). They are obstacles by the speed of the current and configuration of banks rather than by the quantity of water.

During the Fifth Offensive in 1943, the basic operational idea of the enemy was to encircle and defeat the main striking group of our Army in the area between the Piva and the Tara. However, in spite of a terrain difficult to pass and obstacles formed by the canyons of the Piva and the Tara, our forces crossed the Lower Piva in force and broke through the enemy's encirclement. These two rivers join each other in Soepan Polje and the Drina, formed in that way, flows by Foca and Visegrad winding northeastward to Rogatica, where it turns northwestward, and at Zvornik it turns northward and flows in that direction to its mouth at Raca.

Its valley along the whole length from the springs almost to Koviljaca is a stony, mountainous defile, with rocky sides, wooded here and there. It is a little wider at Foca, Gorazde and Visegrad. From Zvornik downstream the valley becomes broader (2-4 km), and from Loznica even more; at Janja plains open: Semberija in Bosnia and Macva in Serbia separated by the Drina.

The width of the Drina is variable: at Foca, for example, it is about 100 m, otherwise in the upper part it varies from 100 to 180 m, and in the lower part up to 300 m. The depth is between 1 and 4 m; the speed of the current is 1.7 m/sec everywhere. The bottom is stony and with sand bars in some places; the Drina is a fast and wild river, fordable here and there; bridges are at Foca, Gorazde, Medjedja, Visegrad, Ljubovija and Zvornik; the well-known is the bridge at Visegrad, a stone bridge with 9 spans, built in the XVI Century by Mehmed Pasha Sokolovich, Turkish grand vezier, but originally a Herzegovinian. On the Tara, the bridge at Djurdjevicva Tara is important (the road Savnik - Pljevlja).

It could be navigable for ships from Zvornik to the mouth if the bed had been regulated; it is navigable for rafts from Bajina Basta.

Its narrow valley does not allow construction of roads along the whole length, but on some sectors only.

This powerful mountainous river is able to produce over 8 billion KWh. A big power plant is under construction at Zvornik, that would produce the same amount of electric energy as the power plant in the island of Maribor.

Although the river Drina was a strong obstacle, our units crossed it

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during the Fourth Offensive, advancing from Herzegovina; we crossed the Drina at Foca in spite that it was defended by the Italians and the "tchetniks". The crossing was performed north of this provincial town (1st Division) and south of it (2nd Division) on rafts. The crossing of the Drina proves the ability of our forces to cross obstacles during the People's War of Liberation.

The left tributaries of the Drina worth mentioning are:

The Sutjeska, a mountainous river, flowing into the Drina 6 km downstream from village Hum. Connects the upper Drina to Gatacko Polje via Camerno. Along its valley ran the old commercial road from Dubrovnik via Gacko and Foca to the empire of Nemanjici and to Constantinople. Ruins of old castles can still be found in its valley; they blocked the way. It is famous for hard and bloody combats during the Fifth Offensive. The enemy organized defence along this river but our forces broke through.

The Prača, with the railway line Sarajevo - Visegrad - Titovo Uzice running along its valley.

During the Fifth Offensive in 1943, when our forces broke the front on the Sutjeska, the enemy, taking advantage of the Prača as an obstacle, organized a new front along it, but without success, because it was broken too.

The right tributaries:

The Cetina (Cetina) flows south of Pljevlje and joins the Drina at Foca. Fordable, but there are few fords, because of difficult approaches to the river.

The Lim (the length: 191 km) springs from two branches of the Komovi and the Prokletije. These branches join each other at Gasinje, and immediately after that flow into Lake Plav under the name of the river Ljuca. From the lake it flows northward under the name of the river Lim. Its valley is narrow, banks very steep, rocky, unforested or overgrown with trees. The depth is from 1 to 4 m, and the width in the upper part 30 m, and in the lower up to 100 m. Bridges are at Murino, Ivangrad, Prijepolje, Ustibar, Rudo. Along the lower Lim a railway line (0,76 m) runs from Medjedja to Priboj.

The Crni Rzav and the Beli Rzav are small mountainous rivers; important, because they connect Visegrad and Titovo Uzice via village Mokra Gora and village Sargan (second-class road and 0,76 m railway line).

The valley of the Jadar is fairly wide, fertile and well cultivated. Connects Loznica and Valjevo, i.e. the Drina valley to the Valjevo lowland area and the upper Kolubara. In 1914, during the offensive of Austro-Hungarian forces from Bosnia to Serbia it served as the line of operations for the upper Kolubara valley.

The Kolubara (117 km). The Kolubara is an obstacle from village Slovac to the mouth because of muddy bottom and configuration of banks. The bed is divided into several backwaters here and there. Declivity small. The bottom is muddy along the whole length. The banks are up to 3 m high, broken, here and there swampy, overgrown with thick bushes. At the mouth, the river forks into many backwaters. The width of the Kolubara is from 15 to 60 m. The depth at normal water level is 1.2 m. Current very slow. Floods are considerable and over the whole plain along the river, whereby waters of the Tamava, the Ub and the Kolubara mix together. High water level of the Sava causes overflowing of the Kolubara. The Kolubara valley is very fertile, rich and well populated. There are few bridges.

Its tributaries are:

The Ljig - with the narrow-gauged railway line (0,76 m) running along its valley and connecting the Kolubara valley with the Zapadna Morava valley via Gornji Milanovac and Cacak.

Its left tributaries worth mentioning are: the Tamava and the Ub,
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smaller rivers, important by positions extending along these rivers which played an important role in 1914. From the military point of view the Kolubara, with its rich, wide, passable, and communicative valley, may serve as a line of operations. A fairly large obstacle on this line is a ridge of low and medium mountains - the watershed between the Kolubara and the Zapadna Morava, which can make difficult the transfer of operations to the Zapadna Morava valley.

The Velika Morava is our biggest river after the Sava (216 km). It flows across the middle of Serbia, dividing it into two parts: eastern and western. This is the biggest and longest river in Serbia with a very well developed water system; its valley is the richest valley in Serbia. Therefore, its importance from both military and economic point of view is very great.

It is formed by two rivers: the Juzna (Binacka) Morava and the Zapadna (the Golija) Morava.

The Juzna Morava (295,9 km) springs from the northern spurs of the Skopska Crna Gora.

At village Binac it is a mountainous river and flows through the Konculski Tesnac (defile), which is about 10 km long. From Vladicin Han to Grdelica it flows through a defile known as Grdelicka Klisura, which is about 30 km long, and further downstream through the Stalac defile for about 20 km.

The Juzna Morava has plenty of water from its mouth to 10 km northeast of Vranje, but very little further on upstream (in dry weather) - 0,500 cu. m. per second; water level varies; overflows its valleys.

Width: upper and middle part from 15 to 30 m, the lower part up to 100 m.

Depth: at medium water level in the upper part 1,5 m, in the lower 2-3 m.

Speed of current: high water level - 2,6 m/sec, medium water level - 1,3 m/sec; low - 0,6 m/sec.

Several fords.

Bridges: 2 wooden, 1 of concrete (at Dzep), 18 railway bridges.

Flooded: Aleksinacko Polje, Nisko Polje (1943), Leskovacko Polje.

No melioration.

In severe winters ice is a danger for bridges.

Tributaries of the Juzna Morava. Left Tributaries:

The Veternica - valley fairly rich and populated. Flows into the Juzna Morava north of Leskovac. At normal water level fordable everywhere.

From the military point of view it is important because it is a by-pass for any force whose task would be to outmanoeuvre the Grdelicka Klisura.

The Jablanica - along which a road and a cart-track run between Leskovac and Pristina via Medvedja.

The Toplica - from the military point of view important because a second-class road and railway line run along its valley and along the valley of the river Lab, connecting Kosovo and Nis. Due to this, the valleys of the above mentioned rivers are most suitable lines for operations from northeast towards Pristina, i.e. in reverse towards Nis.

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Right tributaries are:

The Moravica - springs from the Ružen mountain and flows into the Juzna at Bujanovac. Its valley is wide, fertile, well cultivated and densely populated. It is a part of the Morava-Vardar valley, which means that this small river and its valley is very important from the military, traffic and economic point of view.

A second-class road and railway line run along its valley; these communications, running from the Juzna Morava valley over the Presevo watershed run down to the Vardar valley. Owing to this, this valley may become a part of a very important line of operations (strategical), communications and lateral communications.

The Vlasina - flows off from Lake Vlasina and into the Juzna Morava north-west of Vlasotinci. From its source to Vlasotinci it flows through a defile thus being unproductive and fairly poor. Second-class roads run along its valley connecting Leskovacko Polje and Pirotsko Polje to Belopalanacko Polje; a cart-track runs from village Svodje towards the saddle Dascani Kladenac; and a branch via Crna Trava towards Lake Vlasina.

The Nisava - is formed by two small rivers, the right is called the Nisava, springs at village Gindi in Bulgaria and flows through Dimitrovgrad, and the left, the Jerma, springs east of Lake Vlasina. They join each other at village Sukovo, in the southeastern part of Pirotsko Polje.

Both branches are small mountainous rivers important because along their valleys and along the valleys of their tributaries run communications from Jugoslavia to Bulgaria along the very important line of operations (the Nisava line of operations). From the Sukovo bridge the Nisava flows northward, connecting Pirotsko Polje, Belopalanacko Polje, the Sicevacka Klisura and Nisko Polje.

At the bridge at village Sukovo the Nisava enters Pirotsko Polje, a flat, fairly large, fertile, cultivated and densely populated lowland area, 14 km long, and from 2 to 4 km wide; this area is separated from the Bela Palanka lowland area (Belopalanacko Polje) by a short defile.

Belopalanacko Polje is somewhat smaller, 16 km long and 1-2 km wide; fertile like Pirotsko Polje.

At village Gradiste the Nisava enters the Sicevacka Klisura (Sicevac defile). The Sicevac defile, with the exception of a small part, is very narrow, with very high, bare and rocky sides. Then the valley becomes wider, extending into Nisko Polje which is fertile, well cultivated, populated as the two mentioned above.

From village Sukovo to its mouth the Nisava is fordable at several places at normal water level. The bottom is either stony or gravelled; the width is from 500 to 100 m, and the depth from 1 to 1.5 m.

The Nisava valley, although often broken by defiles, is fairly wide, fertile well cultivated and thickly populated. If we add that it is an extension of the Morava valley towards the east, then its importance from the military, traffic and economic point of view is great. It is of special importance from the military point of view because it is the best and shortest way between the Morava valley on one side and the Sofia plateau and the valley of the river Maritsa, on the other.

It is a serious obstacle to the advance from the north southward and vice versa, in connection with defiles and surrounding terrain - the spurs and steep slopes of the Svrlijska Planina, the Vidlic mountain, the Stara Planina and the Vlaska Planina mountains.

The Moravica springs from the Devica mountain, flows across the Soko Banja lowland area, through Bovanski Tesnac (defile) and flows into the Juzna Morava at Aleksinac. It is important because its valley is the connection between

tje Juzna Morava and the Timok; along its valley runs a second-class road: Aleksinac - Soko Banja - Knjazevac (or Boljevac - Zajecar).

The Zapadna Morava springs from the Golija mountain and flows northward to the mouth of the river Djetinja east of Pozega. Up to this town it is called the Moravica; from there it turns eastward and flows under the name of the Zapadna Morava until it joins the Juzna Morava at Stalac. Along the Moravica valley runs a second-class road from Pozega to Ivanjica; further on, as a cart-track it runs over the Javor mountain to Sjenica.

From the Pozega lowland area the Zapadna Morava flows through the Ovcar-Kablar Defile (Ovcarsko-Kablarska Klisura). After this defile its valley is wide, fertile, rich and densely populated!

The Zapadna Morava is richer in water than the Juzna Morava; it is from 100 to 150 m wide and 1,2-2 m deep. The bottom is hard and gravelled; current: medium speed; in the lower parts fords are rare.

The tributaries of the Zapadna Morava. The left tributaries:

The Distinja is important because it connects the Zapadna Morava and the Drina at Visegrad via Sargan and the river Rzav.

The Dicina connects the Kolubara and the Zapadna Morava.

The Gruza - with a second-class road and railway line running along its valley from Kragujevac to Kraljevo.

The right tributaries:

The Ibar (195 km) springs from the western spurs of the Hajla mountain. Its valley is narrow with insignificant widenings. Its banks are very steep and high, up to 700 m here and there, and wooded. From Kosovska Mitrovica to Raska it flows through a defile; at Raska the valley is a little wider but gets narrow again, and at Kraljevo the Ibar enters the Morava valley, where it is 60-70 m broad. There are few bridges: at Rozaj, Kosovska Mitrovica, Raska, Usce and Kraljevo.

Considering the depth, width, speed of current, configuration of banks and profile of its valley, the Ibar is a serious obstacle. The importance of the river Ibar is that it connects the Zapadna Morava valley and Kosmet. Its importance is greater because a road and a railway line run along its valley; its valley is thus a second line connecting Serbia and Macedonia.

The Ibar valley plays the role of an important line of communications; so it served to the Germans during World War II to relieve the traffic along the line: Belgrade - Nis - Skoplje and, besides, the railway line in the Ibar valley was the export line for raw material from the Ibar Basin. In order to break this railway line, the Kraljevo Partizan Detachment attacked Usce and the railway bridge 105 m long, for those were the most vulnerable places along this line. In addition strong enemy forces that defended the above mentioned places, an armoured train was brought from Kraljevo. In spite of such a defence, Usce was taken at the end of September 1941 and the railway bridge demolished, and between Raska and Usce operated a partizan train, since the Ibar valley had been liberated on this sector.

The tributaries of the Ibar, important from the military point of view, are: the Sitnica and the Raska.

The Rasina (82 km) is important because of a second-class road that runs along its valley to Jankova Klisura (through the defile as a cart-track), connecting the Zapadna Morava valley (Krusevac) through Jankova Klisura, to the Toplica valley, or via Brus to the Ibar valley.

The Velika Morava is formed at Stalac by the Zapadna Morava and the

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Juzna Morava and flows northward. Flows into the Danube east of Smederevo, at the old fortress of Kulic.

From Stalac to the Bagrdanski Pasnac (Bagrdan Defile) its valley is wide, fertile and well populated. After the Bagrdanski Pasnac it flows along a 5-20 km wide valley, along both sides of which is hilly terrain. The Velika Morava floods its valley almost every year.

Although the quantity of water is sufficient for navigation, it is not navigable, because its bed is not regulated.

The Velika Morava has the characteristics of a plain river. Along a straight line it is 245 km long.

Winding, it cuts bends alone. Its bottom is gravelled and sandy. From the mouth to the Ljubicevsko Most (the bridge at Ljubicevo) it is navigable for larger objects (up to 100 tons).

Mellioration is being carried out, bends are being cut, but the declivity will be increased.

The width at the mouth is up to 280 m, in the Markovec area only 50 m, in average 110-130 m.

Water level and depth: water level variable; depth at normal water level: 2-3 m.

Speed of current:

- high water level 2.4 m/sec;
- medium water level 1 "
- low water level 0.5 "

During the low water level period the river is fordable at many places.

The tributaries of the Velika Morava. The left tributaries:

The Lepenica - important by the connection between the Velika Morava and the Zapadna Morava via Kragujevac. Along its valley run a second-class road and a railway line from the Velika Morava valley via Kragujevac to the Gruza valley and the Zapadna Morava valley at Kraljevo.

The Jasenica is important by the connection between the valleys of the Velika Morava and the Kolubara: second-class road Velika Plana - Topola - Arandjelovac - Lazarevac. Along the valley of its left tributary the Lug runs the main railway line Velika Plana - Belgrade. The terrain on its right bank is higher than on the left and, together with the river Jasenica, offers good conditions for the organization of defence from the attack from the north.

The Ralja is important because of the railway line Belgrade - Mala Krsna - Pozarevac or Smederevo and strong positions along its right bank (the Varovnica).

The right tributaries:

The Resava. Along its left bank there are good positions, on which the advance of the enemy from the north towards upper Pomoravlje could be checked; the flanks of these positions are supported - the left by the Velika Morava and the right by the Beljanica and the Kucej mountains, which are difficult to pass.

The importance of the Velika Morava is very great, both from the military and cultural point of view. The valley, which is 20 km wide at some places, is so fertile that we call it the granary of Serbia. Densely populated - over 100 inhabitants per square km. Quartering and food are available even for operational units.

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The Velika Morava valley, as well as the valleys of the Juzna Morava and the Zapadna Morava, and also the valleys of some tributaries, especially the Nisava and the Moravica, are suitable as lines of operations, tactical lines and lines of communications, the rivers themselves as obstacles and their banks as positions. Operations along the Velika Morava valley would not meet such difficulties, as on some other lines in Serbia either east or west of the Velika Morava.

As a line of communications, in addition to railways and good roads on both sides of the Velika Morava, may be used the Velika Morava itself, along which rafts loaded with supplies can navigate. Once when the Velika Morava is regulated for the navigation of steamers, its importance as a line of communications will be much greater. However, it may separate friendly units advancing along both banks by its wide bed, swampy tracts and quantity of water.

The Velika Morava as an obstacle, with its valley and surrounding hilly and mountainous terrain, offers very favourable conditions for the organization of defence on both sides.

The Mlava (122 km) springs east of Zagubica and flows into the Danube at Kostolac. The valley of the lower Mlava is called Stig, one of the most fertile areas in Serbia. The upper Mlava, to Gornjacka Klisura, is a mountainous river flowing across the lowland area Homolje by Zagubica. From Petrovac the current gets slow, and the bottom muddy. Due to this, although the Mlava is not very broad (30 m) and deep (1-1.5 m), it is not fordable, nor can be crossed without bridges; there are several bridges. Along the Mlava valley run a railway line (0.76 m) from Pozarevac and a second-class road which, via Zagubica and Brestovacka Banja, lead to Bor and Zajecar, so that this valley is a natural connection between the lower Morava and the Timok valley.

From the military point of view the Mlava is important because in its middle and lower parts it is closely connected to the Morava valley, thus becoming an integral part of a line of operations that would run along the Velika Morava valley. This role played the valleys of the Velika Morava and the Mlava in World War I in 1915, when they were used by the Germans.

The Pek (112 km) is worth mentioning from the military point of view, considering that its valley is a natural connection between Pomoravlje and Timocka Krajina (Krajina on the map). A railway line and a road run along its valley to Brodica.

The Porecka Reka (39 km) is formed by two rivers: the Crnajka and the Saska. The first springs from the Stol, and the second from Majdanpek. The Porecka Reka flows into the Danube east of Donji Milanovac.

The upper Porecka Reka flows along a narrow valley, with steep, rather rocky and thinly populated banks. The valley in the lower part is somewhat wider, but banks are the same as along the upper Porecka Reka and also thinly populated. The whole area within the water system of this river is called Porec.

From the military point of view the Porecka Reka is very important, for on the sector from Golubec to Tekija it is the only good approach to the Danube from the south. Besides, it is the shortest connecting link between the Danube (Donji Milanovac) and the lower Timok (Negotin).

The Timok (182 km) is formed by two rivers: the Beli (Knjazevacki) and the Crni (Rivovirski) Timok.

Fordable at normal water level along the whole length, with the exception of the part from village Bregovo to its mouth, where it is muddy. The left bank is a little higher than the right; population fairly thick. The Timok is an obstacle from Knjazevac, i.e. from Lukovo to its mouth because of its water mass and configuration of banks. Width: down to Zajecar 15-30 m, and further on downstream 30-60 m.

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Depth: 1-2.5 m. Speed of current: to Zajecar 1.2-1.5 m/sec, further on downstream 0.5-0.8 m/sec. The bottom is gravelled, and in lower part muddy. The banks are mainly high and broken, at some places rocky, in lower part swampy. During the high water level period the river floods the plain at Zajecar and Negotin. The banks are overgrown with high trees and bush.

Along the valleys of the Crni Timok and the river Crnica run a second-class road and a railway line (0.76 m) from Zajecar to Paracin.

From the military point of view the Timok is an important river, because its valley can serve as a lateral line of communications, but its weak point is the vicinity of the frontier (6-10 km); further on, the river as an obstacle, with the surrounding terrain, offers favourable conditions for the organization of defence, whose positions would be supported on flanks by the Danube and the Stara Planina mountain and, finally, its valley and the valleys of its two branches can be used as lines of operations either from the north southward or in reverse, or from the east westward or vice versa.

The Adriatic Sea Water System

About 20% of the total surface area of Jugoslavia belongs to this water system.

This water system is very long, but very narrow, because mountain chains of the Dinara system, which form the eastern border of this water system, are extending mainly parallel to the Adriatic Coast and at a small distance from the coast-line. Owing to this, most of the rivers of this water system are short. They are narrow, almost without any valleys, so that surrounding terrain, naturally, is unproductive, poor and thinly populated. Fairly long rivers are the Neretva, the Drin, and the Soca, spring beyond the eastern border of the main ridge, piercing through it, so that their valleys are very narrow and with high, rocky sides.

The following rivers beyond to this water system:

The Soca springs south of the saddle Vrsic. Down to Bovec it is an obstacle because of the configuration of its banks and steep slopes, and in the lower part also because of the quantity of water and speed of current. Downstream of Gorica during the low water level period it is not an obstacle, because its water is taken away along the Soski Kanal via Trzic for industrial purposes.

From the spring to Bovec the Soca flows through a rocky defile, where its bed is from 6 to 45 m broad. At Bovec and village Zaga it widens up to 500 m. Further on to Kobarid its valley is rocky, 40 m broad; from here to Sv. Lucija (the bridge on the Soca) the bed is deeply cut in rocks, about 80 m wide, gravelled. From Sv. Lucija to village Log, 3 km southwest of Sv. Lucija, the Soca flows through a 30-40 m deep and rocky defile; further on to village Solkan it is also rocky, 40-80 m wide. Downstream of Solkan the bed is gravelled, to Gorica deeply cut in rocks and 80-200 m wide. From Gorica towards Trzic it is from 100 to 200 m wide, and towards the mouth about 150 m. The Soski Kanal is from 60 to 80 m broad.

The bottom of the bed is rocky in mountains and defiles, and gravelled at wider places. Along the whole length the bottom is covered with large stony blocks.

The banks of the Soca are rocky in mountains and defiles; down to Bovec there are high rocks; from Kobarid to Sv. Lucija they are 3-15 m high and broken; from here to village Log high rocks can be found, and further on to village Solkan the banks are rocky and 10 to 30 m high.

In the lower part, in the plain from Solkan to Gorica, the banks are 10 to 60 m high, steep, mainly stony plateaus; from Gorica to village Gradiska the banks are 2 to 20 m high, steep and rocky. From the mouth of the river Vipava to

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village Zagraj, 3 km southwest of Gradiska, they are rocky; from Gradiska on, the banks are 1 to 3 m high.

The width to Solkan is 10 to 40 m, further downstream 100-150 m.

The depth - normal to Bovec 0.3-1 m, to Kobarid 0.5-1 m, to Sv. Lucija 0.5-2 m, to Log 2-4 m, from village Zagraj to Trzic 0.3-0.5 m, and from here to the mouth 1-5 m. Between Sv. Lucija and Solkan the depth is greater at some places because of dams at power plants.

Water level: usually normal from May to September; high, due to melting snow, from March to April, and due to rains, in October and November. Water level rises from 4 to 6 m, and sometimes even 7 m; low in mountains in January and February, and if the summer is dry, in July and August, too.

The left tributaries of the Soca: The Idrijca - along whose valley runs the second-class road Sv. Lucija - Idrija - Donji Logatec. Along the valley of the right tributary of the river Idrijca, the river Baca, runs a second-class road from Tolmin via Podbrdo to Skofja Loka and a railway line from Sv. Lucija via Podbrdo (a tunnel over 6 km long) to Jesenice.

The Vipava - with the first-class road Gorica - Ajdovscina - Postojna.

The right tributaries of the Soca: The Koritnica springs underneath the peak Jalovec; flows into the Soca east of Bovec. Along its valley runs a second-class road over the saddle Predel and along the valley of the river Ziljica to Kanalska Dolina (Italy) and further on to the valley of the river Zilja in Austria.

The Ter (Tore) springs north of Tarcento (Italy); normally, with very little water, but in spring and in autumn water level rises up to 5 m. Receives all small rivers and brooks that spring along the frontier section south of village Zaga - the Veliki Vrh (trig. 1558 m). Some tributaries are: the Nadiza (Natisone) and the Idria (Judrio); the upper Idria is the frontier line between Jugoslavia and Italy.

The river Soca is a very strong obstacle in case of advance from the west eastward and vice versa. This importance is not the result of its width and quantity of water, but first of all because it is deeply cut in high and medium mountains, because its banks are rocky, often very high and steep, and places suitable for crossing very rare.

By its position in relation to the frontier, and considering that a very good first-class road runs along its valley, and to Tolmin a railway line, too, the valley of the Soca would be a very good lateral communication if it were not too close to the frontier line, from which it could be placed under a powerful artillery fire.

During the First World War, within the Soca area, twelve battles took place; the most famous was the twelfth one, known as "the battle at Kobarid".

In Istria the biggest rivers are: the Mirna, the Cipri and the Rasa. They are not very important from the military or economic point of view, except that their valleys are narrow and deep, making the advance difficult.

The Zrmanja (79 km) springs at the joining point of the mountains the Velebit and the Dinara, south of the source of the river Una; flows mainly along a narrow and steep valley; flows first into the Novigradska Mora and then flows off to the Velebit Channel. It is a strong obstacle, not so much by the quantity of water, as by the characteristics of the banks, which are high and in some places very steep. The speed of the current is great with many cascades. There are few places suitable for crossing, and the construction of bridges is difficult because of steep and almost unapproachable banks and because of fast current. From Obrovac it is navigable for small ships. Never gets frozen.

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It is important not only as an obstacle, but also by a second-class road that runs along the upper valley from Knin to the Una valley or to Graoac (Lika).

The Krka (111 km) spring under the name of the Butusnica in the vicinity of the sources of the Una and the Zrmanja, at the joining point of the Velebit and the Dinara. It is famous by the falls at Skradin, known as "Skradinski Buk", where water falls down along 17 stairs for over 40 m. Downstream of the falls the river is navigable, flows through Prokljensko Jezero (Lake Prokljan) and through Sibenicka Draga into the sea. The Krka is a serious obstacle from Knin to its mouth, especially because of steep banks. Along its valley in the upper part of the river Butusnica runs a second-class road from Knin via the Grahovo saddle to Bosansko Grahovo and, besides, the Una railway line.

The Cetina (107 km) is the longest river in Dalmatia. Springs in the Vrljika lowland area, from the foothills of the Dinara mountain, flows across the Vrljika lowland area and Sinjsko Polje and into the Brač Channel at Omis. At village Zadvarje there are beautiful cascades - Velika Gubavica and Mala Gubavica. This river is similar to the Krka and the Zrmanja. The falls "Gubavica" are 48 m high. The power plant "Tito" is constructed here.

As an obstacle it is important because of the second-class road which runs along its valley connecting the Northern and the Middle Dalmatia: Knin - Sinj - Makarska or Imotski, as well as because of a third-class road which runs along its valley inland from the sea over the Mosor and the Biokovo. Finally, it can serve for the organization of a firm defence in connection with the surrounding country.

The Neretva (208 km) springs from the southern spurs of the Zelengora in the vicinity of the saddle Cemerno. Until the river Rama joins it, the Neretva flows northward; from here to its mouth, south of Ploce, it flows southward. The first part of this river is called Borac, extending from the source to village Ulog. This part of the river has great declivity, steep and 500-600 m high and wooded banks. The second part is called Zupa, extending from Ulog to the south of the river Rama. In this part the valley is deep and narrow, deeply cut in between the mountains; the Orvanj, the Prenj, the Visocica and the Bitovnja.

From the mouth of the river Rama to Mostar the Neretva flows between the mountains the Prenj and the Gvrsnica. Here, the current is fast, practically there is no valley, but individual widenings; the bed is very narrow, the banks are very high (800 - 1000 m), rising abruptly, and bare. Lowland areas worth mentioning are: Bijelo Polje - north of Mostar, Mostarsko Polje - south of Mostar and Neretva - from Capljina to the mouth of the Neretva.

From Mostar to Capljina the Neretva valley is quite different from the upper part. The river flows south of Mostar across Mostarsko Polje, then at village Buna enters a narrow valley with hilly terrain on both sides which are 150-250 m high; very steep and rocky. Woods gradually disappear to be replaced by pure Herzegovinian karst; Bosnian middle-European climate is replaced by Herzegovinian - Mediterranean climate; vineyards appear, fig-trees, olive-trees, dog-roses; instead of Bosnian wooden houses, Herzegovinian compact villages with houses of stone appear. At village Pocitelj (4 km northeast of Capljina) the valley becomes wider and at Capljina it is about 3 km wide.

From Capljina the Neretva valley becomes a wide, partly swampy and insufficiently cultivated plain. This plain is not healthy, because it is flooded from November till April. At the mouth of the Neretva, a wide, swampy delta of 12 arms is formed. This delta is 10 km wide. The width of the Neretva is from 100 to 150 m; the depth is nowhere less than 1 m, and at some places (eddies) it is 10 to 20 m.

From Metkovic it is regulated and on that sector smaller boats can navigate (up to 1000 tons). In spring and in autumn the water level rises rapidly and the crossing by a ferry is possible only upstream of village Pocitelj. Fords are rare and can be found only down to Metkovic. Bridges worth mentioning are at Konjic, at

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the mouth of the Rama and at Jablanica; in Mostar, there are: an iron bridge of modern construction, two big bridges of concrete and an old Turkish bridge only for pedestrians and pack animals with a span of 20 m wide and 19 m high. Downstream of Mostar there are bridges at Capljina and Metkovic and a railway bridge at Gabela.

Along the Neretva valley run a second-class road and a railway line (0.76 m) from Ploca to Konjic and further on over the Ivan Planina mountain to Sarajevo and to the valley of the Bosna river. The middle part of the Neretva is connected to the Drina valley via Nevesinje and Gacko, and the upper part from Ulog via Kalinovik.

From Jablanica to Konjic there is an artificial lake now, which will produce tremendous energy for new power plants.

From the military point of view the Neretva, by its extension and communications running along its valley, could be very suitable line of operations from the Adriatic Littoral and further on to Serbia, but the relief of the territory across which it flows and the profile of the valley make this very difficult. The very entrance into the Neretva from the sea is under protection of very good positions on both sides of the mouth, and the entrance into the Neretvanski Kanal is defended by the peninsula Peljesac and the island Hvar.

Along the whole length of the river, the Neretva is a serious obstacle by the configuration of its banks which are very difficult to approach, by steep and rocky sides of its valley and by the quantity of water in spring and in autumn. During the Fourth Offensive in 1943, our forces came to the Neretva which had to be crossed in force. But that was not the only difficulty; the situation was critical because our forces were encircled. We defeated the enemy in detail and created conditions for the crossing of the Neretva. We crossed it on the sector: Jablanica - Ostrozac under our attack, without pontoon bridges and with thousands of the wounded. During the low water level period in summer and during droughts the river is fordable at some places. The difference between the low and high water level is great; the Neretva is one of those rivers whose water level is variable, especially after heavy rainfalls in high Herzegovinian mountains.

The tributaries of the Neretva are: The Rama, an important tributary of the Neretva, because along its valley runs a road, a connecting link between the Neretva valley and the upper Vrbas via the saddle at Prozor. This is a small mountainous river, with a deep and narrow valley, like the Neretva; since a big power plant is under construction at Jablanica, a lake will appear in the Neretva valley, from Konjic to the mouth of the Rama, and along the lower Rama, 30 km long.

The Trebizat springs near Imotski. It connects the Neretva valley and Imotsko Polje, Duvanjsko Polje, Livanjsko Polje and Sibjsko Polje.

The Moraca (94 km) is formed by two rivers, the Zeta and the Moraca.

The Zeta springs from Nicksicko Polje, east of village Carev Most, in the southern part of this field, sinks, to reappear 6 km further down near village Povlja, west of monastery Ostrog. Joins the Moraca north of Titograd.

The Zeta is important because its quite wide valley connects Titograd and Nicksic; a narrow gauged line and a road runs along its valley. The appearance of this valley among high and karst mountains makes it more important, for it is a part of that long furrow that extends from Nevesinjsko Polje in the direction the Zalomska Reka - Gatacko Polje - the Duga defile - Nicksicko Polje - the Zeta valley - the Titograd lowland area - Lake Skadar.

The Moraca springs from the northern slopes of the Stozac mountain beneath the peak Moračka Kapa. It is a mountainous river, with a narrow and wild valley which is wider north of Titograd (Zeta). It flows into Lake Skadar west of Plavnica.

The Lower Moraca is about 200 m broad and about 3 m deep; its valley is rather marshy. The Moraca is the biggest river in Crna Gora (Montenegro). Its whole water system was called Zeta in the Middle Ages and reached the Drin.

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In addition to the Moraos, Lake Skadar receives the following rivers:

The Crnojevica Rijeka. Springs near Rijeka Crnojevica from a very strong source so that it is navigable even for ships from Rijeka Crnojevica to its mouth. It is 17 km long and its valley is marshy.

The Crmnica - a smaller river, but worth mentioning for its waters the fertile area Crmnicko Polje. Flows into Lake Skadar at Virpazar which is connected to Bar by a second-class road and a narrow gauged (0.60 m) railway line, and to Rijeka Crnojevica by a road.

From Lake Skadar flows off the river, the Bojana, along a wide, mainly swampy valley and flows into the sea at Sv. Nikola. It is navigable for small sea steamers from its mouth to village Oboti (in Albania), and during the high water level period along the whole length. It is a considerable obstacle, particularly in spring and in autumn. After it leaves Lake Skadar it receives from the left side an arm of the river Drim which permanently covers its bed with drifts, which spoils regular flowing off from Lake Skadar and navigation on the Bojana. That raises the level of Lake Skadar, so that it often floods low places on the shore, especially in our territory.

If the bed of the Bojana were regulated for regular navigation for sea steamers, Skadar would be a sea port.

The river Bojana, as the frontier line between our country and Albania, is a strong obstacle.

The Drim - formed by the Beli Drim and the Crni Drim.

The Beli Drim springs from the Zljev mountain. With the exception of the part immediately after the source which is in mountains and a few kilometres long, the Beli Drim flows across hilly ground to Prizren. This part is called Podrimlje.

West of Prizren it enters a defile between the mountains the Pastrik and the Koritnik, about 40 km long, called the Vrbnicka Klisura. This defile extends into Albania until the Beli Drim joins the Crni Drim at Kukes.

From Vrbnica to Kukes a second-class road runs along the left bank from Prizren.

The Beli Drim is rich in water; it is a rapid river with hard banks and bottom. During the normal water level period fordable at several places. The level rises in spring and in autumn; then the crossing is only possible across bridges, of which the "Svanjski most" on the road Prizren - Djakovica is in our territory.

From the military point of view the Beli Drim is very important for our country and for Albania for along its valley the best communication from Northern Albania to Metohija and Kosovo Polje and in reverse runs along it, so that it can be used as a line of operations.

The Crni Drim springs in Albania and shortly after that flows into Lake Ohrid at monastery Sv. Naum; it leaves the lake at Struga and flows straight to the north; joins the Beli Drim at Kukes. West of Debar it leaves our country and enters Albania. Its depth is up to 2 km; the current is very rapid. North of Struga it enters a defile, leaving it south of Debar, and further on flows across the Debar lowland area. In this plain its banks are deeply cut in here and there.

Fords are rare, and also bridges, of which worth mentioning are: at Struga, Debar and Kukes.

Some of its tributaries are:

The Sateska, a small river, whose valley is the connection between the Kicevo lowland area and the Struga lowland area. A road and a railway line (0.60 m) from

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• Urid (Struga) to Kicevo run along its valley.

The Redika, a mountainous river with the bed deeply cut in mountains, narrow valley, steep and high sides and rapid current. It is a strong obstacle. Along its valley runs a road which connects the Debar lowland area to Polog via Mavrovi Hanovi, and along the valley of its left tributary runs the third-class road from Debar to Kicevo.

Subterranean streams

In addition to the above described rivers of the Adriatic water system, there are a number of underground rivers that belong to this system, although they do not flow into the Adriatic Sea directly. Some of them, as for example, the Pivka and the Unec were mentioned before as part of the Ljubljanska.

Subterranean rivers worth mentioning are:

The Reka flows from the western slopes of the Obruc mountain by Ilirska Bistrica to Divaca.

The Lika, about 30 km long, 1-6 m deep, collects water from Licko Polje by several tributaries (the Jadova, the Otesica). During the high water level period floods the field north of village G. Kosinj for several weeks.

The Gacka (in Gacko Polje), 3-4 m deep, in spring and in autumn floods the field for several weeks.

The Sijica flows across Duvanjsko Polje, where it sinks. Together with its small tributaries, during the long periods of rain in spring and in autumn, floods Duvanjsko Polje which becomes a lake; the traffic is entirely suspended and confined to by-pass roads in mountains difficult to pass.

The Bistrica flows across Livanjsko Polje.

The Trebnisnica (94 km) springs south of Bileca, flows through Trebinje and across Popovo Polje, and there, in the westernmost part of the field, sinks. It is not fordable at normal water level, so is a considerable obstacle. The banks of the upper Trebnisnica are high and rocky. Partially dry in summer, but in spring and autumn floods Popovo Polje, which becomes passable not earlier than in June. From the military point of view it is an obstacle.

Along its valley run a railway line from Gabela to Trebinje - Titograd and Dubrovnik and a second-class road which forks via Trebinje and Bileca to Gacko Polje (Gatacko Polje) and the Drina valley, or from Trebinje via Vilusi to Niksic.

The valley of the Trebnisnica is a defile from Bileca to Trebinje, with the exception of some small widenings; the plain south and west of Trebinje is, for the most part, well cultivated and fertile. Further on northwestward the valley spreads in Popovo Polje, whose southeastern part is of karst, difficult to pass and covered with bush. The greater part of Popovo Polje, is well cultivated.

By the direction of its extension (north-south and then east-west), by the configuration of its banks, by the profile of its valley, steep sides and by its impassability, the Trebnisnica valley offers favourable conditions for the organization of a firm defence, either with the front facing the sea or the east.

The Aegean Sea Water System

The Aegean water system covers 10% of our territory.

The axis of this water system is in the Vardar which collects all water

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from Macedonia, except the river Crni Drim which flows into the Adriatic Sea and the river Strumica which flows into the river Struma and into the Aegean Sea.

Characteristics of this river system are: the country is unforested and because of that water level varies; some rivers are even dry in summer time, while during storms they become torrents.

The Strumica is the tributary of the river Struma. Springs from the southern spurs of the Plackovica mountain. Important because it connects the Struma valley with the Bregalnica and Ovce Polje via the valley of the river Kriva Lakavica. Its valley can serve as a line of operations from the Struma valley to the Vardar valley via Strumica and Valandovo, or via Stip towards Ovce Polje and Skoplje. Besides, its upper and middle valley can serve as a concentration area and as a part of the operational base for the forces to operate eastward along the Struma valley or southward to Solunsko Polje (Salonika lowland area), for it is fairly large, fertile and rich. The river Strumica floods its valley downstream of village Dabilja, due to which the terrain is fenny; melioration, that is being carried out now, will make this valley very useful.

The Vardar (258 km in our territory) is the most important and the biggest river in Macedonia. Its importance is equal to the Velika Morava and the Maritsa, i.e. what the Velika Morava is for the northern part of the Balkan Peninsula, or the Maritsa for the eastern, the Vardar is for the southern part.

The Vardar springs southwest of Gostivar, at village Vrutok, on the eastern side of the Nicpurska Planina mountain (trig. 2197 m); flows across the Tetovo lowland area (Polog), then through the defile between the Zeden mountain and the spurs of the Sar-Planina mountain, across the Skoplje lowland area, through the Taor defile, the Titov Veles lowland area, the Titov Veles defile, Tikves, the Demir Kapija defile and the Ciganska Klisura (defile).

All in all the Vardar is about 350 km long, of which $\frac{2}{3}$ are plains, and $\frac{1}{3}$ defiles. Its width varies: in the Tetovo lowland area 35-40 m, at Skoplje 90-100 m, at the mouth even up to 450 m, and during the high water level period 560 m. Depth: 1-4 m. Speed of current 1-3 m/sec. From Titov Veles it is navigable for ordinary rafts, and from Gradsko for larger rafts. Water level varies. To Skoplje the bottom of the Vardar is covered with big stones, sandy in the middle part and muddy in some places in the lower part; there are few bridges; worth mentioning are: at Gostivar, Tetovo, Skoplje, Titov Veles, Krivolak, Udov and Gevgelija. There are four railway bridges: at Skoplje, at Titov Veles, and 2 south of the Ciganska Klisura (in Greece). The declivity from the source to Gevgelija is 500 m. Along the Vardar valley run: the railway line Skoplje - Salonika and a road which deviates here and there, by-passing the defiles (from Skoplje to Titov Veles).

The middle and the lower Vardar may be an obstacle by the quantity of water. At the beginning of June 1944, the 3rd Macedonian Striking Brigade had to cross the Vardar from the left to the right bank on the sector village Gradec (south of the Demir Kapija), with the aim of joining the 2nd Macedonian Brigade which was stationed in the Kozuf mountain. However, since the Vardar was deep, and the situation did not allow preparations for the crossing, the Brigade did not cross.

The left tributaries of the Vardar:

The Tetovska Reka (Sarska) is a mountainous river: it connects Tetovo and Prizren; in the river valley there is a cart-track, and over the saddle Kara Nikola (elev. 1875 m) in the Sar-Planina there is a horse-path.

The Lepenac springs from the northern spurs of the Sar-Planina; at Kacanik it enters the Kacanicka Klisura (the Kacanik Defile), about 25 km long. The Lepenac is a rapid mountainous river; it often floods the road running along its valley; besides, there is the railway line: Skoplje - Kosovska Mitrovica - Kraljevo.

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The Pcinja springs beneath the peak Bele Vode (trig. 1829 m) in the Dukat mountain. The valley of the upper Pcinja, to village Trgoviste, is very narrow, pathless here and there. From Trgoviste the valley becomes wider 200-500 m in the length of about 15 km and on that sector there is a third-class road. Trgoviste - Bujanovac running to the Juzna Morava valley. Then the Pcinja flows between the Kozjak and the Rujen Planina mountains, through a 15 km long defile, turns southward and enters a $\frac{1}{2}$ -2 km wide valley. At village Klecevoe it receives the Kriva Reka from the left side, turns southwestward, flows through Katlanovo and into the Vardar. Its tributary is the Kriva Reka which springs from the northern slopes of the Osogovska Planina. Its valley connects the Skoplje-Kumanovo lowland area and the Custendil lowland area via the saddle Deve Bair. Along its valley runs a second-class road that, further on, connects the Sofia area and upper Povardarje (Povardarje - the Vardar valley).

The Bregalnica springs from the Malesevske Planine, flows across the lowland areas: Malesevo, Pijasec, Kocane and Stip. Waters all these areas and makes them fertile, especially the Kocane lowland area. To Delcevo it is not an obstacle; from Delcevo to Istibanja flows through a rocky defile, which is a serious obstacle. Along this sector the road Kocane - Delcevo by-passes the valley from the south. In the Kocane lowland area the bed of the Bregalnica is sandy and muddy and forks into several arms, irrigating rice fields. At Stip the valley gets narrow, and from there to its mouth the Bregalnica flows through a narrow and pathless defile with a few insignificant widenings.

From the military point of view the valley of the Bregalnica, considering the direction of the flow from Delcevo to Stip and fairly suitable connection with the Struma valley over hilly terrain east and north of Delcevo, from which two roads run to Bulgaria, one to Gornje Džumanja, another via Kadin Most to Custendil and Marek (Dupnica), could serve as a line of operations from the Vardar valley towards the Struma and vice versa. Wide places in its valley, especially the one in the Kocane lowland area, are suitable for concentration and quartering of fairly large units.

By its quantity of water the Bregalnica is not an obstacle in normal circumstances, for it is fordable almost everywhere.

Although the river Bregalnica does not represent an obstacle by the quantity of water, rice fields around Kocane are a serious obstacle. In 1944, the 3rd Macedonian Striking Brigade, advancing from the Plackovica along the Bregalnica valley towards Kocane, came to rice fields, across which only infantrymen could pass. Other parts of the brigade passed along a cart-track among rice fields after a careful reconnaissance.

The well-known "Bregalnica Battle" was fought on the Bregalnica in 1913 between the Bulgarian and the Serbian armies. Bulgarians, although allies of the Serbs in the war against Turkey, unexpectedly attacked the Serbians, but were defeated, and thus that second Balkan War ended.

The right tributaries of the Vardar:

The Treska springs from the Bistra Planina mountain under the name of the Velika Reka and enters the wide and long Kicevo lowland area, fertile and well cultivated. The remainder of the flow is in a defile, the middle part of which is called Forec.

From Kicevo downstream to its mouth the Treska valley is of karst, impassable, thinly populated and poor, both in supplies and roads. Along its middle part runs a path from Skoplje to Brod.

Although the river Traska, by the direction of its flow and its position in case of operations from upper Povardarje to the Vrna Reka valley - Pelagonija, might be important, it cannot be used as a line of operations because of karst and

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impassability of its valley. Only some small detachment could operate along its valley from upper Povardarje, for only in some places in its valley there is a footpath.

The river Treska is a serious obstacle, considering the configuration of its banks, surrounding terrain and rapid current.

The Babuna springs from the southern slopes of the peak Solunska Glava (trig. 2540 m), the summit of the Jakupica; the upper Babuna is a mountainous river, and in its middle part it flows along a 1-2 km wide valley, along which the railway line Titov Veles - Prilep runs; the lower Babuna flows through a defile, wild and bare valley, joining the Vardar southeast of Veles. The river Babuna is important because its valley is the shortest way from the Vardar valley to the northern part of Prilepsko Polje; besides, a railway line runs along its middle part. The road Titov Veles - Prilep does not run along the valley of the river Babuna, but crosses it and runs along the valley of its right tributary the Crnicka Reka, choosing the shorter way over the saddle Prasad in the Babuna mountain.

The Crna Reka (201 km) is the most important tributary of the Vardar; springs from the southern spurs of the Baba Sec mountain. The valley of the upper Crna Reka is unforested, rocky, short of water and narrow; downstream of village Zvan the valley is wider (2-3 km), fertile and well cultivated to village Bucin, where the Crna Reka leaves the country of medium mountains and enters Prilepsko Polje. From Bucin it flows across Prilepsko Polje, and further on through Topoldanski Tesnac at Bakarno Gumno (about 2 km long), entering Bitoljsko Polje, about 35 km long and about 13 km wide. It flows across this lowland area to village Skocivir where it enters the Mariovska Klisura and through it to village Vozarci, entering the Tikves lowland area and flowing into the Vardar southeast of Gradsko.

The valley of the Crna Reka downstream of village Zvan, and especially Bitoljsko Polje, is highly fertile and well cultivated. From the economic point of view Prilepsko Polje and Bitoljsko Polje (Pelagonija) are the centre of the whole region on the right side of the Vardar.

The upper part of the Crna Reka is fordable; after it enters Prilepsko Polje and Bitoljsko Polje the crossing is more difficult, because the banks and the bottom are muddy, so that crossings are possible usually across bridges. In the Mariovska Klisura and down to its mouth the Crna Reka is a strong obstacle by the quantity of water and rapidity of current, and especially by the configuration of the banks. At the mouth it is muddy. Although the middle part of this river is mountainous, it is fairly passable nevertheless, for there are bridges in that part of the river, and the whole Mariovo area is intersected by roads constructed in World War I.

The Mariovo area is a thinly populated area; population live on cattle breeding, saw mill and lumber industry.

The river Raec is worth mentioning among the left tributaries of the Crna Reka; it is a small river with a narrow valley, important by the road Gradsko - Prilep running along its valley over the saddle Pletvar.

The right tributaries of the Crna Reka, the Semnica and the Dragor, are worth mentioning; they are small rivers flowing along narrow valleys till they enter Pelagonija. In Pelagonija, the Semnica, in particular, is a serious obstacle in rainy weather because of its muddy bed. The Dragor flows through Bitolj. Both rivers are important because along their valleys run roads connecting Pelagonija and Bitolj to the Kicevo and the Resen lowland areas.

Along the upper Crna Reka runs to village Bucin roads; along the middle part from village Brod to village Skocivir (the road to Kajmakalan), and along the lower Crna Reka from village Vozarac to its mouth (the road Gradsko - Prilep). In Pelagonija roads do not run along the river itself because of swampy terrain. Winding flow of the Crna Reka almost impassable and pathless valley exclude it as a line of operations.

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The Vardar valley is naturally connected to the Morava valley and both are called the Morava-Vardar valley, a natural furrow and the most suitable way from the central and northern part of our country and the Balkan Peninsula in general to the Aegean Coast.

By its flow across the middle of People's Republic of Macedonia and having as many tributaries as the Morava, coming from various directions, east and west, the Vardar makes traffic between various regions of our South possible, and also between almost all of them and its valley, which is the hydrographic and traffic spine of Macedonia. In its valley and in the valleys of its tributaries there are larger and smaller fertile and rich areas which, in addition to the economic importance, are also important from the military point of view. For example, the Skoplje lowland area, in connection with the Kumanovo lowland area, is a first-class operational and manoeuvring territory; the Titov Veles lowland area is the most important junction of communications in central Macedonia.

Leaving the Demir Kapija, the Vardar enters lower Povardarje at Gradec; it extends to the mouth of the Vardar in the Salonika Bay. The Gevgelija and the Salonika lowland areas, separated by the Ciganska Klisura, are most important areas here.

The geographic and strategic importance of the Vardar is being increased by the existence of the large and well developed port Salonika, which is the most important port on the northern coast of the Aegean Sea. Salonika may be useful to us during the war as connection to overseas countries if Greece is either neutral or our ally. Important are the railway lines: Salonika - Skoplje and Salonika - Bitolj.

Accordingly, the Vardar valley, depending on the situation, may be used either as a line of operations or as a line of communications or as a lateral line of operations.

Hydrography: Conclusion

If we look at the map, studying all the rivers of our country, we shall see that the most important is the area between Osijek (the mouth of the Drava) and Smedersvo (the mouth of the Velika Morava). Within this, comparatively small territory, all rivers of the Black Sea water system in our country are being gathered, with the exception of a few smaller rivers of the northern part of Serbia (the Mlava, the Pek, the Porecka Reka and the Timok). This means that all waters of the Pannonia Plain, the greatest part of Slovenia, Croatia (except Dalmatia), Bosnia, Serbia and the greater part of Crna Gora, i.e. the Danube, the Drava, the Sava, the Drina, the Tisa and the Morava with their tributaries flow across this territory. This is the hydrographic centre of FPRY and, at the same time, the most important centre of that kind in Europe.

The whole network of the above mentioned rivers must influence preparations and conduct of operations (combat actions) to a great extent, especially within our part of the Pannonia Plain, in the northern part of Serbia and in the north-eastern part of Bosnia. This for the reason, because the above mentioned rivers will appear now as strong obstacles separating friendly or enemy forces, now as supports of flanks and then as lines of communication, etc. It follows that no preparation of any operation or operation itself within this hydrographic centre cannot be planned without taking into consideration the influence of one or several big rivers in one of the abovesaid roles.

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CLIMATE

Influences On the Climate of Our Country

There are various weather conditions in our country. Differences in climate are the result of the geographic position of our country and influence of surrounding large water and land masses (Europe-Asian Continent in the northeast, Sahara, permanently hot North Africa and the Mediterranean in the south and the Atlantic Ocean in the west). However, the striking differences in climate of FFRY appear under the influence of the relief of neighbouring parts of Europe and the relief, woodiness, quantity of surface water and configuration of ground in Yugoslavia itself. This local influence changes influences coming from outside to a considerable extent.

Weather conditions in our country mainly depend on the relief. The terrain of our country drops down from the eastern Alps, Bosnian and Serbian mountains towards the Pannonia Plain, from where, along the Pannonian valleys, the influence of the continental climate of Northeastern Europe penetrates into the heart of our country. If it were not for the Pannonia Plain in the north of our country, which in fact is a large gap, but chains of mountains instead, as along other frontiers of our country, the northern part of our country would have the moderate continental climate with more rainfall and would not be exposed to the disadvantageous influence of the continental climate of Northeastern Europe. The influence of the continental climate is mitigated by the eastern zone of the more recently formed mountains to a certain extent (the Carpathian mountain system and the Balkan mountain system), while the western zone of more recently formed mountains (the Alps and the Dalmatian mountains) separates the areas exposed to the continental climate from those influenced by the Mediterranean climate.

The mountains of the Dinara system extend parallel to the Adriatic Coast and not far from it. Thus they mitigate the influence of the Mediterranean climate coming from the Adriatic. Mediterranean climate, modified to a certain extent, can be found in the Littoral and in the islands, in the valleys of some rivers, spreading over some lower saddles into the central part of the country.

The Rhodope mountains are cut by the Morava-Vardar valley along which penetrates the influence of the Pannonia Plain from the north, and the influence of the Aegean Sea from the south. Owing to this, the differences between the Pannonia Weather Zone and the Aegean Weather Zone are not sharp. They are different from those in the Dinara Weather Zone, in which the transition from one climate to another is sudden and sharp.

Our region of high mountains (the Slovenian Alps, the Dinara - Sar Planina chains, the isolated Rhodope mountains and the mountains of the Carpathian - Balkan arch) are distinct from adjoining parts, making thus a separate whole by their height and distance from the seas, by low summer and winter temperatures and heavy rainfalls.

The geographic position influences the climate of FFRY favourably. By its geographic latitude FFRY extends northward almost to 47° (in Prekomurje 46°53'), southward to 41° (the southern part of Lake Prespa 40°51'). Accordingly, our country lies within the Temperate Zone, its greater part being in the southern half of the Northern Temperate Zone. But, weather phenomena, especially temperature, are not distributed in the territory of our country according to the latitude of individual regions, which means depending on the distance of these regions from the equator. In the direction north-south our country covers over 6°; this influences the length of the day and the duration and intensity of insolation. In the northernmost part of the country in summer time the day is by 42' longer than in the southernmost part; the insolation is longer by the same length of time, but the

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rays of the sun in the south fall at a greater angle and, consequently, heating is more intense in spite of shorter insolation.

The influence of large adjoining regions is worth mentioning: the Mediterranean and North African in the south, the Atlantic Ocean in the West, which sends us warmth and moisture (mild winters, abundance of rainfall in winter time) and the continental influence of the vast regions of Northeastern Europe - the largest Weather Zone in Europe, across the Pannonia Plain from the north and northeast and Vlasca Plain (Rumania) and Timocka Krajina from the east. The influence of the climate of Russian eastern and northeastern steppes, although in a mild form, penetrates to Vojvodina (lack of rainfalls).

Type of Climate and Regions

With regard to the geographic division of weather zones and corresponding type of climate, we have the following zones in our country: littoral region along the Adriatic Coast - Mediterranean climate, Pannonia, in the north - continental climate, and mountainous regions, in mountains - Alpine climate. All these weather zones, except the littoral one, are not sharply separated from one another, but gradually exceed the limits of each other, forming transitive weather zones, as for example, the zone of moderate continental climate that extends between the areas of Alpine climate and the areas of continental climate.

Mediterranean Climate and Its Region

Mediterranean climate is formed under the influence of the Mediterranean, from where it spreads across the Adriatic and the Aegean Sea to our Littoral and Povardarje. Chains of the Dinara system of mountains, often rising abruptly from the very coast, prevent the influence of the Mediterranean from penetrating into the central regions of our country, so that Mediterranean climate is confined to the narrow tract of the Adriatic Littoral and islands. This zone is the narrowest below the Velebit, the Mosor, the Bickovo and along the southern Montenegrin Littoral. Nevertheless, up the valleys of the Sova, the Neretva, the Bojana, the Moraca, the Vardar, then over the low saddles, this influence penetrates, somewhat changed, deeply inland as the moderate Mediterranean climate.

Mediterranean climate is characterized by hot and dry summers and short mild winters; there is an abundance of rainfall in winter time.

The Adriatic-Mediterranean region is generally characterized by high summer temperature (summer heat lasts 3-5 months), especially in July, the hottest month of the year.

In Adriatic islands that are surrounded by the sea, summer is not so hot as in the rest of the Littoral.

On the mainland summer temperature is somewhat higher, especially in low areas of North Dalmatia, lowlands of Herzegovina and around Titograd. Summer temperatures in these areas are higher than in the islands. Bare, karst ground in these regions and the air are so hot in sunny summer time, that they are, together with the Vardar region, the hottest regions in our country in summer.

The influence of the Mediterranean penetrates to our country along the Vardar valley, across lowland areas and through defiles, getting weaker and weaker towards the north. It penetrates and spreads out along the Vodena-Ostrovo valley too, reaching Polagonija, but somewhat changed. Also, it penetrates along the Struma and the Strumica valleys to the Strumica lowland area.

This moderate and changed type of Mediterranean climate retains its basic characteristics to the greatest extent in the lowland areas of southeast Macedonia - the Gevgelija - Valandovo and Strumica lowland areas and in Tikves.

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The temperature in these areas is not much lower than in the Adriatic Littoral. Winters are fairly mild.

Mediterranean climate is important for our economy. Hot and sunny summers, with long lasting, quiet and permanently clear weather is very favourable for the cultivation of tropical plants and fruit.

Weather conditions during the winter are favourable, because the temperature seldom, usually for a very short period of time, falls below zero. During January the average temperature in the Littoral is above 5° Centigrade.

Winds. Main winds in our Adriatic region of Mediterranean climate are "bura", "jugo" ("siroko"), "maistral" ("smorac") and "kopnenjak". "Bura" is the result of penetration of cold air front from inland over the Dinaric mountains and through gaps in them, sliding quickly down the slopes towards the sea. "Bura" is sometimes so strong that it devastates the country: takes off the red layer of earth, makes the country bare and dries up the soil, uproots trees, knocks down people, takes off roofs, and even railway cars, obstructs navigation on the sea and demolishes ships.

"Bura" is a dry, often very cold wind, blowing in powerful strokes from the northeast or from the east, sometimes falling with the strength of a hurricane down the steep, bare and karst slopes of the mountains extending along the Adriatic Coast.

Main places at which "bura" penetrates are: Trieste Bay, Gulf of Quarnero (especially Senj), Sibenik, Cape Flöce, Vrulja inlet (between Omis and Makarska), Trstenik Bay (at the northwestern gate of the Mljet Channel) and the Drim (Medua) Bay. "Bura" is comparatively weak on the western shore of Istria, in the Zadar Channel, west of the islands of Dugi Otok, Kornat and Mljet and all along the shore between Cavtat and Ostri Rt (at the entrance of Boka Kotorska).

"Bura" blows in winter. It is like a storm in that period, especially at the end of October, in December, January and March, but sometimes it blows even in May as a storm. The frequency of stormy "bura" in individual years is variable; in some winters there is no strong "bura", in others it blows like a storm for months almost permanently.

In summer time "bura" usually blows one day, sometimes a few hours, but in winter time up to 14 days. Sometimes at the same time "bura" blows in the Gulf of Quarnero, and "jugo" in the southern Adriatic.

"Jugo" comes from North Africa, crosses the Mediterranean, where it absorbs moisture, and appears in our Littoral as a southeast wind.

"Jugo" is a warm, moist wind, bringing oppressive heat, vapour and rain. It is stronger and blows more often in the southern part of the Adriatic than in the northern.

It blows in every season, but most often from March to June in Northern Adriatic, and from autumn to the end of winter in Southern Adriatic.

On the Adriatic, "jugo", in spite of its velocity and duration, is less dangerous than "bura". It blows always with the same strength, so that ships are able to get to harbours. It may be dangerous only off the Venetian shore and off Dubrovnik because of high waves and sometimes because of a sudden change of direction.

In summer time "jugo" blows up to three days, in winter even 9 days, and with stops sometimes three weeks.

"Maistral" ("smorac") blows in summer time shoreward from the northwest or

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west from 10 a.m. to 6 p.m. It is a very pleasant refreshing wind.

"Kopnenjak" blows from the middle of May till the end of August seaward during the whole night; direction: from northeast or east; it, too, is a pleasant breeze.

In the Aegean region of the Mediterranean climate blows a wind similar to "bura", bringing cold air from the Balkan-Podunavlje area towards the Aegean Sea. It is called "vardarac". Most often it drops down from the Sar-Planina and the Skopska Crna Gora mountains, blowing along the Vardar valley towards the Salonika lowland area and Salonika Bay. It brings clear and dry weather.

Our Littoral, compared to the mountainous region in hinterland, gets comparatively little rainfall, although it extends along the Adriatic Coast. In the lower parts of the Littoral the yearly amount of rainfall is about 1000 mm; in the islands it is less - about 800 mm. In the mountains in the hinterland this amount rises to 2000 mm. It is the highest in the Krivosije area (Crkvice) and in Gorski Kotar, so that these regions, in addition to Scotland, are most rainy in Europe.

The driest month is July, but the summer drought lasts sometimes from May to September. Then the land is dry in the Littoral and flora disappears, to get green again in autumn with first rains.

In the Aegean Sea climate zone the amount of rainfall is small, less than 500 mm. The rainiest month is November, the driest July - when all brooks and small rivers are dry.

It is evident that the region of Mediterranean climate gets the highest amount of rainfall when they are not needed (winter), and the least in summer time when they are necessary.

Continental Climate and Its Region

Continental weather zone includes the Pannonia Plain with lower parts of its border. Its border, from the climatic point of view, is the transition between the climatic influence of the region of high mountains and continental influence.

The climate of the Pannonia Plain is mainly influenced by the severe continental climate of Northeastern Europe, which comes into our country in a somewhat changed form over the comparatively low Carpathian mountains. This climate is characterized by cold and long winters, hot summers, variable temperature during the year, low amount of rainfalls and shortage of summer showers.

This low amount of rainfall is the result of the chain of the Alps and mountains of the Dinaric mountain system, which cool the warm and moist winds blowing from the sea, due to which these winds lose their moisture in these mountains and come to the Pannonia Plain without it. Due to its continental position, the Pannonia Plain is, after Macedonia, the poorest region in rainfall (from 500 to 500 mm), and in some years this amount is less than 500 mm. This quantity is insufficient for the growing of woods and because of that this region is similar to a steppe. However, the favourable circumstances are that the heaviest rainfalls are at the end of spring (May-June), that is, when crops and vegetables need moisture, and snowfalls at the beginning of winter, to cover crops and to protect them from cold winds. Without this favourable distribution of rainfall, the Vojvodina would be a desert, and not it is our granary. Summer in the Pannonia Plain is hot; it is as hot as the Adriatic Littoral. Pannonia is very cold in winter. Average temperature in January ranges from 1° below zero to 2° below zero (Centigrade), but sometimes the temperature falls down to -30°.

"Severac" is the most famous wind in Pannonia. It is a branch of air currents that come into the Pannonia Plain from the Eastern and Northern Europe, penetrating further southward. It is a dry and cold wind, dangerous for crops in Vojvodina when they are not covered with snow.

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Continental climate is more expressed in the Timok Basin, which is exposed to a direct influence of the climate of Eastern Europe. Winter temperature is fairly low (in Negotin average temperature in January is -0.8°), while summer temperatures are high (22.7°).

"Kosava" is one of those winds blowing in this region; it is similar to "bura" and blows in winter. It comes from Southern Russia, across the Black Sea, through the gap between the Southern Carpathian mountains and the Balkan Mountain. "Kosava" blows in fits and starts, sometimes for several days, bringing clear and cold weather. Its velocity, sudden appearance and drying up of soil are very harmful to crops and fruit. In winter, it covers roads and railway tracks with drifts and makes navigation on the Danube difficult.

Moderate Continental Climate and

Alpine Climate

The zone of moderate continental climate and Alpine climate covers mountainous regions. From the climatic point of view, this large geographic unit is the transition between the Mediterranean influence of the Adriatic and the Aegean Sea on one hand and the continental influence of the Pannonia Plain on the other.

The climate of these regions is variable due to the influence of adjoining regions and their geographic features (altitude above sea level, relief, woodiness and hydrography).

The climate in the zones of high mountains and higher medium mountains from 1500 to 2000 m (the Alps, the Dinara, the Rhodope, the Carpathian and the Balkan system) is Alpine. Lower regions in these mountains, medium and low mountains and hilly ground, have a moderate continental climate.

Lowland areas and blocked river valleys (karst fields in the Dinara region and other lowland areas in all parts of our country) are of special importance for the climate of mountainous ground isolated and inserted between mountains, protected from cold winds, they are a kind of oasis with a moderate climate, while the top regions of mountains are islands of Alpine climate.

The zone of moderate continental climate covers all regions of Yugoslavia except the zones of Mediterranean, continental and Alpine climate. The higher, southwestern parts of this zone - the zone of mountains of the Dinara system along the Adriatic Coast - are richer in rainfall (about 1000 mm); going down towards the central part of the country this amount drops down to 750 mm. Rainfall is distributed among all seasons.

Summer showers mitigate the heat; so does cool air dropping down from the mountains. Autumn is very long and beautiful; winter does not begin earlier than the end of December; abundant in snow, but without severe winds.

In Bosnia, which belongs to the zone of moderate continental climate, weather conditions are worse than they should be, if we take its latitude as the basis. This is because all valleys of its bigger rivers are open towards the north, because Bosnia is thickly forested, and because its relief rises from the north southward. Similar is the case with Serbia, with the difference that in its northern part the continental climate prevails.

Alpine Climate

This climate is characterized by a larger amount of rainfall, short and fresh summers, and long, cold and snowy winters. In winter, at the bottom of the mountain lowland areas, cold air comes down from the surrounding mountains. It remains in lowland areas for a long time, especially if these are screened by mist. Therefore,

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lowland areas in mountains are colder in winter time than the slopes of surrounding mountains. In summer, the bottom and sides of lowland areas are warmer than adjoining mountainous regions, because the mountains surrounding a lowland area prevent warm air from going up. In the lowland areas of Macedonia summer temperature is considerably higher than in the lowland areas of the Dinara-Alpine regions. It is very hot in Macedonian lowlands.

The climate, together with other factors, influences the flora. Important factors are: duration and intensity of insolation, clouds (density and duration), rainfall (time and quantity), which means heat and moisture, and, in connection with this, the action of winds and the position of terrain itself. Modern technique makes agriculture free from the climate to a certain extent.

The influence of the climate on the whole economy is tremendous. It is true, people fight to conquer some negative elements (struggle against droughts by artificial irrigation, drainage, reforestation of bare land, selection of seed suitable for corresponding weather zone, etc).

Owing to this, it is necessary to study the climate and take advantage of the achievements of modern technique and science that deal with these problems.

The Influence of the Climate On the

Life, Activities, Movement and Com-

bat Actions of Military Units

Since our territory, as a whole, lies within the Temperate Zone, the influence of the climate on army activities is not very sharp.

Every type of climate, however, influences the activities of an army in its own way. So, for example, in the zone of Alpine climate one must take into consideration thick and long-lasting fog from early August; in September and October it is cold and snow falls and covers roads and saddles, which makes the movement and traffic difficult. Long winters and severe cold require special equipment and precautionary measures. In this climatic zone special measures should be undertaken for quartering in tents and, in general, for long periods of living in mountains. Heavy and long-lasting rains also make the activities of an army difficult in mountains. Aviation often cannot operate. All sources and brooks are frozen in winter, so that the problem of water supply appears. Then, avalanches may be dangerous. During the sudden melting of snow in these regions, swift motion of land slides down mountain sides, floods and other phenomena may appear.

In operations against the Serbian Army in World War I, in 1915, in the mountains south of the Zapadna Morava, Austro-German and Bulgarian forces did not achieve their main aim and decisive success - to cut off the retreat, to encircle and to defeat the main body of Serbian forces. They failed because of stubborn resistance of Serbian units, especially against the Bulgarian 1st and 2nd armies, and also because of adverse weather conditions in this mountainous region - snow, rain, cold - which almost paralyzed maneuvering, bringing up of supplies and evacuation by the enemy who was not sufficiently prepared for operations in these mountains.

The heat in the Mediterranean climate, in summer months when the sunshine is intense, quickly exhausts men and makes their activities difficult. Consumption of water is greater, and, on the other hand, many sources dry up. Light clothing and equipment are required.

Dry regions are generally short of water in summer, and karst regions are entirely waterless, so there is a serious problem for the troops; there are almost no sources on karst plateaus. In the Dinara karst region reservoirs are being built for keeping spring water for a dry summer. There are some karst regions

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without even such reserves, except some springs, 12 to 15 km from villages.

Both the Austro-Hungarian Empire and Italy did not solve the problem of water supply before World War I. Both began the war insufficiently prepared for the life and activities of troops in karst regions.

It is indispensable for all commanding officers to have information about waterless regions or areas poor in water, with the exact data about the hydro-graphic network (springs, brooks, rivers, their description and capacity).

"Bura" is able to stop any movement by its velocity, especially along mountain roads and paths in winter time.

In the region of the Pannonia Plain one must reckon with "kosava" (breaking of telephone lines, snow or sand drifts on communications, overturning of tents and even sheds, high waves on rivers and difficult crossing, etc), and in rainy periods, mud, that makes movement out of roads impossible. Here, too, the shortage of healthy drinking water is to be taken into account.

POPULATION

The size of population plays an extremely important role in the economic development of every country. Likewise, the number of inhabitants of a country is of tremendous significance with regard to war potential as one of the chief elements of it. The amount of labour, the size of the army of a country and its supply depend on the number of population.

The development of capitalism caused big changes in the geographic distribution of population and dense concentration of population in towns and great movements that included tens of millions. Whole continents have been populated by emigrants, that is, people who could not exist in their own capitalistic fatherland in Europe.

The emigration of Yugoslav peoples, due to chronic agrarian crisis and impoverishment of working class that was greater and greater, reached its climax between 1878 and 1914. The emigration ended with the world's economic crisis in 1929; thenceforth America has shut the door to new immigrants.

Many a capitalist country has tried to solve the problem of unemployment by way of emigration. About 900,000 emigrated from Italy to France up to 1921, and to America about 10,000,000 people.

Wars generally throw the number and geographic distribution of population into disorder. In that respect, the consequences of the Second World War are worst. So, for example, many people were forced to work in industrial centres of fascist countries, where an incredible concentration of population from all occupied countries was created. Motives for forced migration may be racial (example: forced evacuation of population from Crimea to Siberia, depopulation of Yugoslav national minorities in Rumania and Hungary, the extermination of Jews in Germany and occupied countries) and also political, usually applied by fascists (killing of progressive elements of people in concentration camps or in jail or devastation of whole provinces).

Casualties during World War II were:

... killed in battle	14,450,000
... killed in camps and prisons	5,000,000
... killed by bombing	2,860,000
... died in concentration and P.O.W. camps	11,000,000
TOTAL	33,310,000

From the middle of 1941 till 1943, the fascists killed or depopulated 28 million people.

During our People's War of Liberation we suffered so terribly that about 1,700,000 people were killed, which is a very high percentage compared to the above mentioned casualties.

Population of Our Country From

• 1921 to 1953

According to the census rolls of 1921, 1931, 1948 and 1953 and according to an estimate, our population was:

Year	Population	per sq. km.	Increase (decrease)		Remarks
			In figures	%	
1921	12,425,000	49.4	-	-	-
1931	14,438,000	56.3	2,013,000	16.2%	-
1940	16,420,000	64	1,982,000	13.7%	-
1948	15,751,000 should be 18,310,000	61.4 should be 71.4	Decrease 671,000	Decrease 4.1%	From 1940 till 1948 the increase should be 1,890,000, so that the real deficit is 2,559,000
1949	16,040,000	-	-	-	Estimate
1950	16,250,000	-	-	-	Estimate
1952	16,780,000	-	-	-	Estimate
1953	16,927,000	66.1	1,176,275*	7.5%	* From 1948 to 1953

Between 1940 and 1948 the number of population was decreased by 671,000 due to severe war casualties and reduced natality in the period between 1941 and 1945. This shows that the war brought to us a real deficit of over 2,559,000 people. But, in spite of that, in relation to 1921 our population increased by 3,615,000 till the beginning of 1948, and by 4,502,277 people till March 31, 1953.

This increase is far greater than the total population of Norway or Ireland, almost equal to the population of Finland, somewhat less than those in Denmark and Switzerland. The increase of population in socialist conditions will certainly be quicker because by the improvement of living standards, high natality will be increased, and the mortality rate will be decreased, especially with children. Nevertheless, we need about 8 years to cover the deficit caused by the war.

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The number of population and density by people's republics, on basis of the census of 1953, are:

	Number of Population	Density per sq. km.
Serbia.....	6,983,544	78.67
Serbia in a narrower sense.....	4,460,405 ✓	
Autonomous Territory of Vojvodina...	1,713,905 ✓	100
Autonomous KOSMET district.....	809,234 ✓	
Croatia.....	3,913,753	69.53
Slovenia.....	1,462,961 ✓	72.24
Bosnia and Herzegovina.....	2,843,486 ✓	55.37
Macedonia.....	1,303,906 ✓	49.70
Crna Gora (Montenegro).....	419,625 ✓	30.04

The census roll of 1931 showed that 13.2% of the total population lived in towns, while the census roll of 1953 showed 25%. Countries with developed industry have a higher rate of population inhabited in towns (Great Britain and Belgium over 68%, Sweden 36.6%, Hungary 30%).

In 1921 we had only two towns with over 100,000 inhabitants - Belgrade and Zagreb. In 1931 Subotica joined them, in 1948 Sarajevo and Ljubljana, in 1953 Skoplje.

On 31 March 1953, population in towns were:

Belgrade (together with Zemun)	469,988
Zagreb	350,462
Ljubljana	138,211
Sarajevo	135,657
Skoplje	121,551
Subotica	115,402
Novi Sad	83,223
Maribor	77,124
Split	75,377
Rijeka	75,112
Nis	60,677
Osijek	57,320

The present increase of population in towns and new settlements comes from the rural population. Inexhaustible labour of our country could not be employed in the industry of former Yugoslavia, but now, due to a rapid industrialization of the country, labour from the rural population is badly needed. Mechanization and chemicalization of agriculture will free a great number of peasants who then will be employed in towns. This process is different from the conditions in former Yugoslavia, because the increase of population in towns is under the control of the Government; besides, big centres will not be asylum for unproductive elements as they were before.

Nationalities

On 15 March 1948 there were 13,791,000 Jugoslavs or 87.4% and 1,812,573 other races or 11.37%.

By nationalities the number of population were:

Serbians	6,547,000 or 41.5%
Croatians	3,785,000 or 24%
Slovenians	1,415,000 or 9%
Macedonians	809,000 or 5.1%
Moslems not oriented	809,000 or 5.1%
Montenegrins	426,000 or 2.7%

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National minorities:

Albanians	750,000 or 4.8%
Hungarians	496,000 or 3.1%
Vlahs	103,000 or 0.7%
Turks	98,000 or 0.6%
Slovaks	84,000 or 0.5%
Italians	79,573 or 0.5%
Rumanians	64,000 or 0.4%
Bulgarians	61,000 or 0.4%
Russians	20,000 or 0.1%
Jews	7,000 or 0.04%
Poles	6,000 or 0.03%
Others	44,000 or 0.3%

National minorities in Yugoslavia have all rights as Yugoslav peoples and opportunity for a free economic, social and cultural development. Members of national minorities are in every body of people's authority from the lowest to the highest, they have their own educational institutions, books and press in their own language, etc.

In the building up of socialist society, general and technical education of new cadres play an important role. About 45% illiterate population (about 6,000,000) were inherited from former Yugoslavia. In PR Bosnia and Herzegovina we found 87% illiterate women, in Kosmet 85%, in Macedonia 67%. Very good results have been achieved in teaching them how to read and write.

In the socialist condition of life it is very feasible to make an industrial worker of a peasant by educating him, because the progress of production depends directly on education of illiterate working masses. This is possible by the ideological building up of large masses of people by way of the Socialist Union of Working People, trade unions, youth organizations and pre-military education, supported by various cultural institutions (theatres, cinemas, libraries, museums and the like). Our People's Army plays a specially important role in educating large masses of our people.

The quality of the Army depends, in addition to other factors (ideologic and political in particular), on the pre-military education of the total population and preparations for various functions in war time (operational, rear service, etc).

COMMUNICATIONS

The disorder in the geographic disposition of productive forces, which we inherited from the former Yugoslavia, has left its traces in the inherited traffic - network of communications.

The strongest influence on the construction of communications is the influence of the relief, geologic structure and geographic disposition of productive forces (for land communications), quantity of water and profile of the bed (for river navigation). Better natural conditions for the construction of communications are in the north of FPRJ, a little unfavourable in the south, and worst in the southwest. Natural conditions in our country, that were a serious obstacle to the construction of communications before, are no longer an obstacle to such an extent as they were; the working enthusiasm of our youth proved that while the following railway lines were built: Brocko - Banovici, Samac - Sarajevo, Niksic - Titograd, Doboj - Banja Luka. The following railway lines are under construction: Breza - Vares (21 tunnels along 20 km. of the railway line), Sarajevo - Konjic - Jablanica - Mostar - Ploce (called Kardeljovo for a period of time) and the Adriatic Line Beograd - Bar. All these railway lines were built in unsuitable mountainous or karst terrain, running through a number of rocky ridges, where many artificial

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objects had to be constructed (tunnels, draining canals, retaining walls and embankments, dikes, etc). Each of the above mentioned lines was constructed in an unusually short period of time, with regard to our technique, and all that, taken as a whole, in a very brief period, from 1946 till today.

Traffic is in operation along roads, railway lines, navigable rivers, canals, on lakes, on the sea, in the air; then we have post, telegraph, telephone and radio communication.

All these types of traffic are being developed today; old roads and railway lines are under repair, new are under construction, bridges are being built, new ships are built, ports enlarged and air traffic better and better.

History of the development of our railways is, on a small scale, the reflection of our peoples for the last hundred years.

It was characteristic for the end of the last century and for the beginning of the present one that big capitalistic countries began to construct railways intensely in colonies, occupied territories and semi-dependent countries. That was the result of a race for the sources of raw material and for markets, for an intense exploitation of backward and enslaved countries. So, railways were built for the account of foreign capital, and not for the interest of people and a further development of the countries in which they were built. Such was the case with railways in our country; everywhere, except in Serbia and Montenegro, railways were built under foreign control and occupation. The result was that first railway lines connected the wealth of Slovenia, Croatia, Vojvodina, Bosnia and Herzegovina to Vienna and Budapest and that of Macedonia to Salonika. The network of railway lines built up till 1918 reflected the disintegration of our country among different rulers and, at the same time, the conflict of interests and struggle of imperialistic countries. In the Balkans, along the "Iron Road" the wealth of our country was carried away to foreign countries. So, the situation in our country in 1918 was: individual parts were not at all connected by railways, although they were very close to one another, as for example, Serbia and Bosnia and Herzegovina, Serbia and Vojvodina (except the international road and railway line).

Railways

The network of our railways suffers from the same shortcomings that exist in unbalanced geographic disposition of productive forces, which is a characteristic of capitalism. Basic characteristics are: the density and disposition of railway lines in all parts of our country and intercommunication within the railway network itself do not correspond to the requirement of people living in those territories and to natural conditions, but primarily serve to the interest of foreign and internal capital.

It is worth mentioning that not less than 34 railway lines run across the frontiers in the north and northwest from Yugoslavia to foreign countries, while in the south and in the east there are only 3 railway lines (two to Greece and one to Bulgaria), and none to Albania.

Austro-Hungary built the first railway line in our country in 1846-1849, connecting Vienna and Graz, via Zidani Most and Ljubljana, to Trieste, the main Austrian port at that time. Thenceforth, the railway network in the territory of Slovenia, Croatia and Vojvodina was rapidly developed. In 1869, Turkey built the railway line Salonika - Skoplje - Kosovska Mitrovica; the lines Belgrade - Mis - Sofia and Mis - Skoplje were built in 1879. At the same time Austro-Hungary built the narrow gauged line: Brod - Sarajevo - Metkovic, in 1901 branches to Trebinje, Dubrovnik and Zelenika, and then the strategic line Sarajevo - Visegrad.

In former Yugoslavia the building up of railways was continued, but on a very limited scale. The difficulty in the inherited railways is because their

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tracks are of various width (normal 1.435 m and narrow 0.76 and 0.60 m). Narrow gauged lines were not built as secondary lines to connect two main lines, but as main lines and in the very centre of the country; for example in Serbia and Bosnia (Belgrade - Cacak - Sarajevo). The narrow-gauged lines are of small capacity; at the points where these lines join the normal ones goods are to be unloaded, which requires additional labour and takes time.

The total length of all railway lines inherited in 1941 was 10,700 km (7395 km normal and 3305 km narrow gauged).

We inherited only 43 km of railway lines per 1000 sq km as compared to Italy 75 km, Germany 123 km and 380 km in Belgium.

During the occupation our railways were damaged from 57% to 60%.

After the liberation of the country our railways were reconstructed by the end of 1946. In accordance with our planned economy new lines have been built; they meet the requirements of economic, cultural and other interests of our peoples, and the requirements of national defence in wartime.

Main Internal Railway Communications

The spine of the railway traffic is the line: Sezana - Ljubljana - Zagreb - Vinkovci - Belgrade - Mis - Skoplje - Gwgalija (with the extension to Salonika), which is an international line because it connects the Western and Central Europe to the Aegean Sea and Near East. Its strategic and economic importance is very great. It forks into many other lines that run into other parts of our country. Most important of them are:

- 1) Sezana - Dutovlje - Nova Gorica - Podbrdo - Jesenica;
- 2) Divaca - Kanfanar (Rovinj) - Pula;
- 3) Sent Peter na Krasu (Pivka) - Rijeka;
- 4) Ljubljana: (a) Ljubljana - Trebnje (Sevnica) - Novo Mesto - Karlovac, (b) Ljubljana - Jesenice;
- 5) Zidani Most - Celje - Maribor (Dravograd, Ptuj);
- 6) Zagreb: (a) Zagreb - Karlovac - Ogulin - (Rijeka), (b) Zagreb - Ostarije - Gospic - Knin - Perkovic (Sibenik) - Split (Sinj), (c) Zagreb - Bjelovar - Virovitica - Osijek, (d) Zagreb - Varazdin;
- 7) Sunja: (a) Sunja - Bosanski Novi - Banja Luke, (b) Sunja - Bosanski Novi - Knin - Split;
- 8) Brod - Dobo (Tuzla) - Zenica - Sarajevo - Knjic - Mostar - Cabela (Floce) - Hum (Trebinje) - Bileca - Niksic - Titograd - Uskoplje - (Zelenika) - Dubrovnik (narrow gauged 0.76 m);
- 9) Vrpolje - Samac - Dobo - Zenica - Sarajevo;
- 10) Vinkovci: (a) Vinkovci - Breko - Banovici, (b) Vinkovci - Osijek, (c) Vinkovci - Erdut (on the Danube) - Sombor;
- 11) Stara Pazova - Novi Sad - Sabotica;
- 12) Belgrade: (a) Belgrade - Obrenovac - Lajkovac (Valjevo) - Cacak (Kraljevo) - Titovo Uzice - Visegrad - Sarajevo (narrow gauged 0.76 m), (b) Belgrade - Pancevo (Vrsac - Bela Crkva) - Zrenjanin - Milosevo (Kikinda) - Novi Knezevac - Szeged (in Hungary), (c) Belgrade - Mala Krsna - Pozarevac - Kucevo - Brodica;

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- 13) Mladenovac - Arandjelovac - Lajkovac - Valjevo (narrow gauged 0.76 m);
- 14) Velika Plana - Mala Krsna - Smederevo;
- 15) Lapovo - Kragujevac - Kraljevo - Kosovska Mitrovica - Skoplje;
- 16) Paracin - Zajecar (narrow gauged line 0.76 m);
- 17) Stalac - Krusevac (Kraljevo - Cacak);
- 18) Nis: (a) Nis - Knjazevac - Zajecar - Negotin - Prahovo, (b) Nis - Piroc - Dimitrograd, (c) Nis - Kursumlija - Pristina - Pec;
- 19) Skoplje - Tetovo - Gostivar (normal line) and further on narrow gauged line 0.60 m - Kicevo - (Struga) - Ohrid;
- 20) Titov Veles: (a) Titov Veles - Stip - Kocane, (b) Titov Veles - Prilep - Bitolj.

Planned economy required the construction of new railway lines that would avert shortcomings of the railway network. New railway lines connect our largest and most important mining areas with industrial centres, thus strengthening our economic potential. These lines are:

- 1) Breko - Banovici, 89 km long; runs to the rich mines of hard coal ("Tito's mines" - Banovici).
- 2) Samac - Sarajevo, 240 km long; makes an intense transportation along the Bosna valley possible where there are reserves of vital ore (iron and coal); also, the transportation of timber from the forests within the Bosna river water system. This line is a part of the future Adriatic Line: Sarajevo - the Ivan Planina mountain - the Neretva valley - Ploce.
- 3) Niksic - Titograd, 56 km long; makes a quick reconstruction of Titograd and economic development of Crna Gora possible; serves for the exploitation of ore from the southern part of Crna Gora and crude oil from the Crmnica area.
- 4) Dobojski - Banja Luka, 83 km long; connects the valley of the river Bosna and the valley of the river Vrbas; in fact it is our new lateral communication (parallel to a possible front line), extending from the east to the west, that would run from Belgrade, via Stepojevac, Lajkovac, Valjevo, Loznica, where it will join the railway line Samac - Zvornik (probably Sabac - Zvornik), and from Zvornik it will be extended to Tuzla and Dobojski. In the west this railway line will be extended from Bosanski Novi or from Bihac to Karlovac.

Our youth built these four railway lines voluntarily.

Other new railway lines are:

- 5) Skoplje - Radusa - Tetovo - Gostivar, which will be extended to Ohrid;
- 6) Lupoglav - Stalije, which runs to large coal basins Rasa, Podlabin and Pican;
- 7) Lapovo - Despotovac, connecting the main railway line to the basin of the Despotovac mines of hard coal;
- 8) Bihac - Kulen Vakuf - Knin;
- 9) Kursumlija - Pristina;
- 10) Bor - Crni Vrh;

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- 11) Petrovac na Mlavi - Ladne Vode;
- 12) Poljana - Kreka;
- 13) Brezicani - Ljubija;
- 14) Preserje - Borovnica;
- 15) Sezana - Dutovlje;
- 16) Kucevo - Drodica;
- 17) Sabac - Zvornik;
- 18) The railway line across Pancevacki Rit;
- 19) Bosut - Bihaćina.

A total of 1312 km of new lines have been constructed to far. The railway line (normal track) that will run along the Neretva valley to Ploce is under construction, and the Adriatic Line: Belgrade - Stepojevac - Valjevo - Pozega - Titovo Uzice - Priboj - Bijelo Polje - Titograd - Bar is being prepared; it will be 510 km long (300 km air line).

Our Railway Lines for the International

Communication

Our most important railway line (Sezana - Ljubljana - Zagreb - Belgrade - Nis - Skoplje - Gvgelija) connects our country to the countries of Central and Western Europe (Austria, Italy, Germany, Switzerland, France, etc.) in the north-west, to Bulgaria and Greece in the east and south. At the same time, it is very important for international railway traffic in Europe, because it is a part of a transcontinental line that connects Western and Central Europe to the Near and Middle East.

It forks into other lines that also connect our country and neighbouring countries. These are:

- 1) Ljubljana: (a) Jesenice - Beljak - Instruk - (or Munchen - Zeurich; i.e. Celovec (Klagenfurt) - Vienna (and further on to Germany and Czechoslovakia), (b) Jesenice - Podbrdo - Gorica (Trieste);
- 2) Zidani Most - Celje - Pragersko - Maribor - Vienna and Pragersko - Ptuj - Kotoriba - Nagy Kanizsa - Budapest, (b) Celje - Dravograd, i.e. Maribor - Dravograd and further on to Austria;
- 3) Zagreb - Krizevci - Gyekenes - Kaposvar - Budapest;
- 4) Vinkovci: (a) Vinkovci - Dalj - Sombor - Subotica - Budapest, (b) Vinkovci - Osijek - Pec;
- 5) Belgrade: (a) Belgrade - Novi Sad - Subotica - Budapest, (b) Belgrade - Pancevo - Vrsac - Timisoara, (c) Kikinda - Timisoara - Bucharest - Odessa;
- 6) Nis - Dimitrograd - Sofia - Edirne - Istanbul;
- 7) Gvgelija - Salonika, Bitolj - Lerin - Salonika.

On basis of the density and composition of our railway network, one will find that the transportation of troops towards the frontiers, for the

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moment, until the projected lines and lines under construction are finished, is as follows:

Quick transportation is feasible westward (towards the Italian frontier); northward (towards the Austrian and Hungarian frontier) and eastward (towards the Rumanian frontier north of the Danube);

Delayed transportation can be carried out southwestward (towards the Albanian frontier); northward (towards the Danube); eastward towards the Bulgarian frontier and southward towards the Greek frontier.

Slowest transportation would be towards the Adriatic Littoral towards the Dalmatian and Montenegrin sectors (until the normal gauged line Sarajevo - Ploce and Beograd - Bar are constructed).

Roads

The road network which we inherited suffers from the same shortcomings as the railway network.

Before the war, the total length of our roads was 33,731 km, of which only 897 were with modern surface. The disposition and density of roads did not meet the requirements of individual parts of our country. Most of them and the best were in northwestern and northern regions of the country, and the least in southern and central areas.

The roads in the Dinara-Alps zone have a better surface than those in the Pannonia Plain; they are easier to maintain, because material for repair is available on the spot.

After the liberation of the country, careful attention has been paid to adaptation of roads not only with regard to modern motorization of the transportation, but also to actual economic and cultural requirements of our peoples. The length of roads is planned to be increased up to 35,000 km, of which 2500 km would be with modern surface.

In addition to the existing international roads Subotica - Novi Sad - Belgrade - Kragujevac; Zagreb - Varazdin; Sezana - Postojna - Ljubljana; Ljubljana - Jesenice; Split - Trogir; Postojna - (Kozina) - Rijeka - Novi; Postojna - Gorica - Bovec; Pula - Labin; Zagreb - Varazdin - Maribor and Maribor - Celje - Zidani Most, new roads have been constructed, of which the most important is the highway Belgrade - Zagreb, which will be extended to Ljubljana. New roads are open for traffic: Ivograd - Rozaje and Titovo Uzice - Kokin Brod - Nova Varos ("Partisans' Road"), Belgrade - Smederevo and Belgrade - Valjevo.

The road Prijepolje - Bijelo Polje was reconstructed and a few new bridges of concrete will be built on that sector in order that buses between Serbia and Crna Gora could operate regularly. Along the road Belgrade - Kragujevac - Kraljevo - Pristina - Skoplje wooden bridges will be replaced by bridges of reinforced concrete. Thus, this road will be arterial line during the repair of the new international road Belgrade - Mis - Skoplje that will take place very soon.

Water Communications

(a) Inland Navigation

River-borne transportation and navigation in channels and on lakes is a special type of transportation.

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Our rivers are navigable in the length of 1,790 km
Our navigable channels 200 km

Total 1,990 km

Of all kinds of transportation, the river-borne transport is most suitable for perishable goods, as for example: ore, building material, bricks, tiles, stone, gravel, sand, lumber, coal, mineral oil, corn, etc. Ore from Majdenpek, for instance, is transported by funicular railway to Donji Milanovac, where it is loaded in barges and transported by them up the Danube and the Save to the foundry in Sisak. River-borne transportation is always best when the speed of transportation is unimportant.

Large quantities of goods can be transported by water communications. The tonnage of a barge is 60-70 railway wagons, that is, the capacity is considerably greater than that of a goods train, whose average capacity is 500 tons. A convoy, however, with a tugboat of about 800 HP, composed of 10-12 barges, carries goods in the capacity of 600-800 railway wagons.

The second great advantage of river-borne transportation is its cheapness. Power invested by river transportation means for the tugging of the same quantity of goods is 12 times smaller than by railways, 72 times than trucks and 1,700 times than air transport. Then, investments for maintenance of water communications are incomparably smaller.

So, various kinds of transportation are different. The cost of a ton/km (the transportation of a ton for one kilometre) is the least on the sea, somewhat greater in river-borne transportation, greater in land transportation and greatest in air transport. So, it has been found that for the transportation of wheat for 2000 km the cost of railway transportation is by 112% greater than the cost of transportation of wheat at the same distance along the Danube; the transportation of firewood is by 142% greater. Further on, in case of wheat, the transportation cost along the Danube is only 17.9% of its export price, while railway cost is 38%.

Special importance of river-borne transportation lies in unloading railway communications. Together with the development of economy the turnover of goods is rising, and the turnover of goods is on the increase much more rapidly than the length of railway network, construction of locomotives and wagons. So, river-borne transportation takes a great deal of total transportation of the country, and therefore it is much older than railway transport.

However, under the influence of our climate, the river-borne transportation is not possible during the whole year. In average, two and a half months in a year river transportation is suspended because of ice, which means that every fifth day of the year it is not used for transportation. Then, abnormally low and high water level makes navigation difficult. Further on, navigation on the Danube network should be technically on a higher level, that is, navigation ought to be safer than it is. The Danube waterway should be cleared and made navigable along the whole length for boats over 600 tons. In addition to the abovesaid, river beds must be permanently clear from Detritus.

In conclusion, we can say that our country has an excellent position on the Danubian arterial waterway and, therefore, we should take maximum advantage of it for the transportation.

Fluvial Navigation

The Danube is, by its size, the second navigable river on the European continent. Its importance for the development and life of the countries of Central, Southeastern and Eastern Europe is tremendous. It is an international river. The navigability of the Danube and its important geographic position are vital for the economic development of European countries. For some Danubian countries,

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as Hungary, Czechoslovakia and Austria, the Danube is the way out to the sea. Prospects for the future navigation on the Danube are bright. The Danube is a navigable arterial line, and in the near future it will be connected to the most important parts of Europe by canals. Also, it will be in contact with seas and oceans around Europe and with the most important sea ports in various regions of Europe.

The navigation on the Danube is not so developed today as it should be, considering its international position and suitability for navigation. But in the near future it will be highly developed as the result of industrialization of the Danubian countries and digging of canals.

Due to the importance of the Danube river system, many countries have recently been dealing with plans of how to connect it with other rivers in Europe. So, there is a project for the construction of a canal from the mouth of the Danube to the mouth of the river Dnieper, so that boats could directly navigate from the South-eastern Europe to the USSR. This canal would be 190 km long and would run partially across the lakes along the seaside and partially across the sea at a distance from 30 to 300 m from the coast, with a breakwater along it so that boats could navigate in any weather conditions. Then, there is another project for the construction of an international water communication (the Danube - the Morava - the Vardar to the Aegean Sea (length 640 km)), by which the Danube would be connected to Salonika. This communication between the Danube and the Aegean Sea would shorten the way across the Black Sea by 1500 km. Our project is worth mentioning: the canal; the Danube - the Tisa - the Danube across the Vojvodina in the length of 240 km; width 60-100 m. After the construction of this canal, this rich region would have about 2000 km of water communications, which means the densest network of water communications in Europe after Holland (90 km of water communications per 1000 sq km). Since the 18th century there has been a project for the digging of a canal that would connect the Sava and the Danube between Vukovar and Samac. This canal would shorten the way from Vukovar to Samac by 420 km. Further on, regulation of Bosnian rivers would connect the Danube and the Sava with this economic area, especially with regard to Bosnian ore and wood. The connection between the Danube (the Sava) and the Adriatic Sea would be very important in this case. In addition to the canal Sisak - Zagreb, which would there is a project for the construction of the canal Sisak - Zagreb, which would be part of the future navigable way Belgrade - Zagreb - Ljubljana. Thus, by way of the Sava the Danube will be connected to Slovenia and Croatia. In that way, industrial regions of Slovenia and Croatia will be connected by a water communication to the agricultural regions of the Vojvodina and Northern Serbia.

There are two big obstacles in the Danube for navigation: Djerdap and drifts of sand at the mouth. These two obstacles have been overcome by technical installations.

The river Danube, that spinal column of the Middle European system of water communications, the old arterial line to the Levant, flows by 20.7%, i.e. about one-fifth of the total length of the river, through Yugoslavia, and about 22%, that is, more than one-fifth of the total surface area of its water system is in Yugoslavia. More than seven-tenths, i.e. about 71% of the total surface area of Yugoslavia is covered by the Danube water system and the Danube itself is navigable along the whole of its length in the Yugoslav territory. Yugoslavia keeps the key position within the river system of the Danube, that artery of Europe.

Together with its tributaries the Sava, the Drava and the Tisa, the Danube forms the main network of river communications in Yugoslavia. It flows across the economically most active regions of the Pannonia Plain. In addition to Banat, Backa, Srem and Baranja, other strong economic regions are in its vicinity; Podravina, Posavina, Sumadija, Pomoravlje and Timočke Krajina.

If we look at the map of European water communications, and first of all the line the Rhine - the Danube, with all branches of it (planned or in use), then we clearly see the importance of Yugoslavia in the key position within that network of water communications. Yugoslavia keeps the position of the most important

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junction of communications of this European spine of water communications (the Rhine - the Danube), because in its territory the Danube receives a number of secondary water communications (the Sava, the Drava, the Tisa, canals). If we add that the greatest part of navigable waterways of the Danube water system is in Yugoslavia, then we can say that Yugoslavia is a state of the first degree among Danubian States.

"The Convention On the Regime of the Navigation On the Danube of August 18, 1948" provides that the navigation on the Danube is free and open to citizens, boats and goods of all countries on basis of equality with regard to port and navigation taxes, as well as with regard to the conditions of navigation for commercial purposes. The same Convention provides the freedom of navigation on the Danube in conformity with interests and supreme rights of Danubian States; accordingly, the control of navigation belongs to the Danubian States - contracting Parties of the Convention (FRY, Czechoslovakia, Hungary, Rumania, Bulgaria, USSR).

Gunboats of non-Danubian countries are not allowed to navigate along the Danube, while gunboats of the Danubian States may navigate beyond the frontier only if that is provided by a bilateral agreement of the countries concerned.*

Other navigable rivers are:

The Tisa - navigable along its whole length of 164 km in our territory;

The Tamiš is navigable only from Pancevo to its mouth in the length of 3 km;

The Drava is navigable from its mouth to Čadjevica in the length of 105 km;

The Sava is navigable from Sisak in the length of 592 km. Its navigability depends on water level. During the low water level period it is navigable only from Zebrez, and during the medium water level period from Sabac to its mouth.

The Kupa (for smaller boats) from Karlovac to Sisak (136 km) during the normal water level period, otherwise from Pokupsko to Sisak only;

The Krka from Skradin to its mouth (15 km);

The Neretva from Metkovic to its mouth (20 km);

The Crnojevića Rijeka (12 km) and the Bojana along the whole length (21 km).

All these rivers serve also for river-borne transportation of passengers; the Danube, the Sava, the Drava, the Tamiš, the Neretva, the Krka, the Zrmanja and the Crnojevića Rijeka.

Navigation is not sufficiently developed on all our canals. For the moment, boats circulate along the following canals:

Beždan - Becej - Backo Gradiste (the so-called Veliki Kanal 124 km long);

Mali Stapar - Novi Sad (the so-called Mali Kanal 68 km long) is not navigable temporarily, because it is not clear;

the Begej Kanal (76 km long).

* Germany and Austria, as countries still under occupation which had not signed Peace Treaty, could not sign the Convention, but, being Danubian countries, have advisory status as far as the control of navigation in their territories is concerned.

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Navigation on lakes is poor in our country. Navigation is exercised on Lake Skadar along the line: Crnojevica Rijeka - Plavnica - Virpazar; on Lake Ohrid are routes: Ohrid - Sv. Naum and Ohrid - Struga; on Lake Prespa, during summer, tourist steamers navigate along the whole length of the shore.

(b) Sea Navigation

Gross tonnage of our pre-war marine was 390,000 tons. During the occupation all our ships were taken away by the occupators, and partially sunk; some of them escaped and joined the Allies. After the liberation we found 15,000 gross tonnage. The enterprise "Brodospas" salvaged 20 ships - with the gross tonnage 40,317 tons and in shipyards they have been made fit for navigation.

At the end of 1952, the Yugoslav marine had 251,838 gross tonnage, to say nothing about shipping under 50 tons.

Total transportation of cargo, taken as gross tonnage, during 1952 was 3,384,395 tons, of which 2,347,837 is long distance navigation, and 1,036,558 tons is coastal navigation.

General information about most important ports of FPRY:

Bakar.

Character and rank. Being in the vicinity of Rijeka (10 km), Bakar is an integral part of the Rijeka harbour area, operating as a branch of the Rijeka port. In the main, serves for unloading of special cargo and for export of lumber.

General data. The port is situated in a naturally protected bay. Entering and manoeuvring in the port are easy. The only danger is "bura" that can blow like a storm in wintertime. Two transoceanic ships and three smaller boats of coastal navigation can be put to shore at the same time.

There are no regular lines (except local lines) in this port.

Communications running to hinterland: connection to the railway line Rijeka - Zagreb.

Bar.

Character and rank. Local port now; large, modern port is under construction. The existing break-water will be extended by 250 m, for the protection of the port and for putting in of two transoceanic vessels. The port will have modern installations for loading and unloading cargo. It will be connected to hinterland by the railway line Belgrade - Bar which is under construction. Serbia, Kosmet and Macedonia will then gravitate to this port.

Communications running to hinterland: for the time being, the narrow-gauged railway line Bar - Virpazar (0.60 m).

Bar is a port along the regular line of coastal navigation.

Dubrovnik.

Character and rank. Export, import and tourist port. Economic background of the port, together with Ploce, are FR Bosnia and Herzegovina and FR Crna Gora.

General data. The port is situated in a naturally protected bay - Gruz. The approach to the port is safe. Along the embankment there are nine places for transoceanic ships and seven for smaller ships of coastal navigation.

The regular line of coastal navigation touches Dubrovnik. All lines of the

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"Jugoslav Line" touch Dubrovnik conditionally.

Communications running to the hinterland: the narrow-gauged railway line Dubrovnik - Gabela - Mostar - Sarajevo, then Dubrovnik - Niksic - Titograd. Roads to: Split, Kotor, Sarajevo, etc. Air lines during the summer season to: Sarajevo, Belgrade, Zagreb, Titograd, Skoplje.

Ploce.

Character and rank. The port is being developed into one of our main export and import harbours. After the construction of the railway line Sarajevo - Ploce some of the northeastern parts of our country will gravitate to Ploce. It will soon be a large, modern port with modern installations for loading and unloading cargo.

General data. The port is situated in a naturally protected bay which ships reach along a channel 1000 m long, 60-90 m wide and 9 m deep. Two transoceanic ships and 1-2 smaller boats of coastal navigation can be put to shore at the same time. The embankment for passenger steamers is separate and 120 m long.

Regular line touches Ploce.

Communications running to hinterland: connections to the narrow-gauged railway line to Sarajevo, Dubrovnik, Titograd, Zelenika. Good roads to Sarajevo, Split, Dubrovnik.

Kotor.

Character and rank. The port is of local importance (transit of goods to Crna Gora). At the same time, a touristic centre.

General data. The port is very well protected and safe. Medium ships with the draught up to 6 m can be put to shore, and also several small boats.

The regular line touches Kotor.

Connections: the road to Hercegovi, Dubrovnik, Cetinje, Titograd, Bar, Ulcinj.

Rijeka.

Character and rank. The main import-export harbour. Centre of our maritime trade. Connected by first-class lines of communications with the whole Yugoslav territory, so that its economic background are FR Slovenia, Croatia (without Dalmatia), Serbia so far and even Macedonia. Good railway communications with the Danubian countries make Rijeka a transit port for foreign goods.

General data. The port is protected from all winds. The depth along the shore varies; from 5 to 9 m. The embankments can receive 20 transoceanic ships and a number of smaller ships. The length of operative embankment is 4,470 m. The port has 38 cranes.

There are regular lines of coastal navigation and transoceanic lines.

Pula.

Character and rank. The main port of Istria.

General data. The port is composed of two bays in the southern part of Istria. The outer serves as anchorage, while the inner is the commercial port. The inner port can receive only medium and small ships.

The regular line touches Pula.

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Connections with hinterland: the railway line Pula - Divaca joining the line Trieste - Ljubljana - Rijeka. Good roads to Trieste and Rijeka. Air lines to Rijeka and Zagreb.

Split.

Character and rank. Import and export port. The turnover of goods influenced by developed industry (three factories of cement, the shipyard "Vicko Krstulovic", factory of plastic material, the enterprise "Brodospas", etc). The port is the economic centre of Dalmatia and a touristic centre.

General data. The port is divided into two parts. The town port is the commercial port, while the northern port, that includes Vranjicki Zaliv and Solinski Zaliv, is the industrial port. The town port can receive three transoceanic ships and a number of passengers and cargo boats of coastal navigation. The wind "bura" influences the manipulation in the northern port, in which four transoceanic ships can be put to shore at the same time.

The regular line of coastal navigation touches the port and all the lines of the "Jugoslav Line" touch Split conditionally.

Connections with hinterland: the railway line to Knin and from there to Bihac - Belgrade, that is, Ostarije - Zagreb. The narrow-gauged railway line to Sinj. Good roads to: Dubrovnik, Sarajevo, Zadar, Zagreb. Air lines to: Belgrade, Dubrovnik, Sarajevo, Skoplje, Titograd and Zagreb.

Sibenik.

Character and rank. Ore, non-metals and lumber exported: ore, coal and ooke imported (for local industry).

General data: the port is to be entered along the channel of Sv. Ante, 1,5 km long and 120-300 m wide. The port is entirely protected. There is place for 4 transoceanic ships and for a number of medium and small boats. New embankment is under construction.

Ships of regular coastal lines touch Sibenik.

Communications running to hinterland: the railway line Sibenik - Knin and from there Knin - Ostarije - Zagreb, Knin - Bihac - Belgrade (Banja Luka). Good roads running to Zagreb and Split.

Zadar.

Character and rank of the port. Local, serves for the supply of the town and environment. Considering that there are no railway communications with hinterland, coastal navigation is highly developed.

General data: the port is safe in any weather conditions. The embankment can receive one transoceanic ship and several smaller.

Ships of the regular coastal lines touch Zadar.

Connections: roads to Knin and Sibenik. In summer season, air lines to Zagreb and Sibenik.

Zelenika.

The port is of local importance. Serves for the export of bauxite and lumber from Crna Gora. The port is not entirely protected from south winds. Capacity of the embankment: one transoceanic ship and two smaller.

The regular line does not touch this port.

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Communications: the narrow-gauged railway line to Sarajevo and Titograd, roads to Dubrovnik, Kotor and Ulcinj.

Tivat.

In Boka Kotorska, serves for military purposes.

Main lines:

a) In The Adriatic

Rijeka - Kotor
Rijeka - Ulcinj
Split - Dubrovnik
Rijeka - Split
Rijeka - Split - Ploce
Split - Kotor

On the main lines ships touch only bigger ports.

Local navigation between small ports is carried out by ships grouped in seven administrative sections: Pula, Rijeka, Zadar, Sibenik, Split, Dubrovnik and Kotor.

b) Regular Lines Outside the Adriatic

The name of the line	The number of voyages per year	Ports
The Adriatic -- North America	22	Rijeka, Split, Cape Bon (Ras Addar), Algiers, Tangiers, Casablanca, New York, Philadelphia, Tangier, Trieste
The Adriatic -- Northern Europe	24	Rijeka, Dubrovnik, Messina, Algiers, Oran, Tangier, London, Hamburg, Rotterdam, Antwerp, Trieste
Levant	41	Rijeka, Trieste, Sibenik, Dubrovnik, Laodicea, Beirut, Alexandria, Port Said, Venice, Trieste

Large shipyards are at Rijeka, Split and Pula, and smaller at Losinj, Korcula, Trogir and Kraljevica.

The role of our marine in the international trade on the sea is getting more and more important because of an increased number of ships, especially large ones.

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Airways

Our air traffic is under the control of the state enterprise "JAT" - Jugoslovenski Aerotransport". Its lines are:

Regular Local Lines

Belgrade - Zagreb - Ljubljana
Belgrade - Sarajevo
Belgrade - Titograd
Belgrade - Skoplje
Sarajevo - Zagreb

Seasonal Local Lines

Belgrade - Dubrovnik
Belgrade - Sarajevo - Dubrovnik
Belgrade - Split
Belgrade - Sarajevo - Split
Belgrade - Hercegovina
Zagreb - Dubrovnik
Zagreb - Split
Zagreb - Rijeka
Belgrade - Zagreb - Rijeka - Pula
Belgrade - Skoplje - Ohrid

Regular International Lines

Belgrade - Zagreb - Graz - Frankfurt
Belgrade - Zagreb - Zurich
Belgrade - Skoplje - Salonika - Athens
Belgrade - Zagreb - Munich - Paris
Belgrade - Skoplje - Istanbul

Seasonal International Lines

Rijeka - Graz

Posts, Telegraph, Telephone

and Radio Communications

These services are under the control of the General Directorate of Posts, Telegraph and Telephone in Belgrade. The whole territory of Yugoslavia is divided into eight Directorates (now enterprises). They are:

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	Number of post-offices	Inhabitants per post-office	Number of services per inhabitant yearly
Belgrade	569	9,539	46
Novi Sad (For Vojvodina)	348	5,240	32
Zagreb	705	4,769	47
Split	230	3,060	34
Ljubljana	523	3,315	70
Sarajevo	363	8,425	17
Skoplje	151	8,643	22
Cetinje	84	4,937	26
TOTAL IN FPRY	2,973	6,022	39

All our post-offices (with the exception of a few of them) have telegraph and telephone services. Post-offices in islands use telegraph instead of telephone. Minor post-offices have only telephone service.

Telephone and telegraph service is being automatized now. The plan provides teleprinters in the seat of every People's Committee in districts. Telephone communications are automatized in every town, but not long-distance network. "Groups" of some smaller networks are automatized only in Slovenia. So, for example, Kranj, with some places in its vicinity, Bled, Radovljice, Jesenice and Skofja Loka, are connected in a network and in contact without any exchange. There are a few similar networks, and our plan is to organize such groups in the whole territory of Yugoslavia.

Radio Stations are in the centres of republics: Belgrade, Sarajevo, Skoplje, Titograd, Zagreb and Ljubljana, and at Dubrovnik, Split and Rijeka. They communicate with foreign countries, too.

ECONOMIC GEOGRAPHY

The most important, basic elements for the development of every process of production are land and soil, reserves in ore, waters, forests. All these elements play an outstanding role in that process.

Along with the development of science and technique people become more and more independent from geographic elements and more successfully overcome obstacles caused by unfavourable weather conditions. The development of traffic is very important in overcoming natural obstacles.

The sea, deserts, high mountains and other regions difficult to approach were obstacles to the development of mankind at the time when it had primitive transport. The development of technique has overcome these obstacles, and as a result, settlements and various branches of industry have been developed in regions that, by

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their geographic conditions, were not suitable for any economic activity.

Economic Problems Inherited From

Former Yugoslavia

Industrially developed countries exploited our country which was technically backward. They brought our agricultural products, lumber and ore at a very low price, and sold their industrial products at a very high price. Investing their capital in the economy of Yugoslavia, foreigners gained not only the control over its development, but they had large profits plundering this rich country and exploiting its cheap labour. In 1940, about 9.4 million dinars of foreign capital were invested in Yugoslavia.

Industry. It was not the interests of foreign capital to allow metallurgy and industry of machines to be developed in Yugoslavia that would raise modern technique, especially war technique to a higher level. It needed, first of all, raw material (metallic and non-metallic ore, wood, cereals and industrial plants). The economic development of former Yugoslavia between 1918 and 1941 took place in a period of struggle for raw material, because with the development of heavy industry the demand for raw material was increased. Without heavy industry, especially industry of machines and chemicals, Yugoslavia coped with many difficulties. Hence, the level of the total amount of its production was very low, far lower than in most west European countries, some of which were poorer in natural resources. Owing to this, Yugoslavia was unable to produce heavy armament and completely depended on other countries.

Irregular development of industry in individual regions of our country till 1918 was continued during the period between the two world wars. For 20 years the number of industrial enterprises was increased in Slovenia from 509 to 912, in Croatia from 629 to 1361, in Vojvodina from 428 to 818, in Serbia from 290 to 718, while in Orna Gora it was increased from 10 to only 22 and in Macedonia from 28 to 127.

In many industrial enterprises technical equipment was poor and installations old, that other countries had discarded as unprofitable.

Metallurgy, metal-manufacturing, chemical and electro-industry were in swaddling clothes.

Foreign capital held in its hands: 91% of metallurgic industry, 78% of mining, 61% of textile industry, 56% of metal-manufacturing industry, 51% of lumber industry, 44% of power plants, 41% of leather industry, 28% of glass industry and 15% of paper industry. It was characteristic that industry depended on other countries. So, for example, spinning mills were abroad and weaving mills in Yugoslavia.

War industry was poor and dependent on other countries. Technical equipment for the army (modern signal communication, equipment for engineering and chemical units, heavy armament) was imported. The amount of equipment imported also depended on other countries. In 1940, at a critical moment, all countries ceased to deliver equipment for the Yugoslav Army, even those who were paid in advance. Some of them gave the excuse that they themselves were in the war at that time and, subsequently, unable to deliver the equipment.

General characteristics of other economic branches in former Yugoslavia were as follows:

Mining. Foreign capital interfered with regular development of this branch of economy; besides, exploration was insufficient;

- lack of modern mechanization and poor technical equipment with many mines lowered the production;

- concessions for the exploitation of ore and minerals were given to the French, English, Belgians, Swiss, Swedish, Italians, Germans, Czechoslovakian and Hungarian capital. Foreign capital had, thanks to this, vital strategic raw material in its hands (copper, lead, etc);

- working up of raw material was not carried out in our mines, but at some other place, even abroad; exceptions were Bor and Trepcia;

- raw material was finally worked up abroad (copper).

Agriculture. The census of 1931 showed that 76.3% of the total population of former Yugoslavia dealt with agriculture. This means that it was predominantly an agricultural country, and since it mainly exported raw material and not manufactured ware, it became dependent on countries industrially developed and was that way up to the People's Revolution; it was in a semi-colonial position in relation to countries with highly developed industry; during the first period, from 1918 to 1929 - to the West, during the second, from 1929 to 1941 - to the Axis Powers.

Economic backwardness can be clearly seen from the structure and distribution of land:

The size of estate in hectares	The number of land owners	% of all owners	Their estates in total	
			in hectares	in %
From 0.01 to 0.5	158,904	8	43,407	0.40
From 0.5 to 1	175,532	8.84	135,758	1.20
From 1 to 2	337,429	17	514,369	4.80
From 2 to 5	676,284	34.02	2,287,578	21.50
From 5 to 10	407,237	20.50	2,873,158	27
From 10 to 20	174,068	8.80	2,380,829	22.36
From 20 to 50	49,314	2.49	1,388,570	13.04
From 50 to 100	5,156	0.26	338,071	3.20
From 100 to 500	1,593	0.08	294,409	2.80
Over 500	208	0.01	389,826	3.70
TOTAL	1,985,725	100.00	10,645,975	100.00

Broken into fragments, land estates in Yugoslavia were unable to provide modern machines for cultivation and to apply agro-technical measures (chemicalization and mechanization) in order to protect themselves from unfavourable climate and pest.

Poor crop yield in Yugoslavia brought it to the twelfth place among European countries.

The average yield of cereals from 100 hectares of land was:

Holland.....	319 tons
Belgium.....	268 tons
Denmark.....	263 tons
Sweden.....	252 tons
Norway.....	205 tons

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Austria.....	173 tons
Czechoslovakia.....	163 tons
Finland.....	156 tons
Hungary.....	151 tons
Italy.....	139 tons
Bulgaria.....	136 tons
Jugoslavia.....	109 tons
Rumania.....	93 tons

Industrial plants were neglected and for that reason food and textile industry suffered.

There was no proper intervention of the state and its assistance in cattle-breeding. Instead to be intensive, the fancy was extensive.

A great deal of forestry was in the hands of foreign capital; it was backward because of poor assistance and intervention of the Government which was to blame for irrational exploitation of forests.

Devastation of Our Economy

During The Occupation

Jugoslav economy suffered severe losses during the occupation. Immediately after the capitulation Yugoslavia was divided into seven separate regions, although as a whole it was included in the system of German war economy. Such division and plundering exploitation of all seven regions produced a general deadlock of economy during the occupation. The aim of the German economic policy was plundering of our country as much as possible, drawing maximum from our labour and orienting the whole agriculture and industry towards the meeting of German war requirements. In connection with the invasion of fascists, by the number of its population and its national wealth, Jugoslavia suffered comparatively heaviest casualties and losses.

After the war Yugoslavia found itself in ruins. All over the country 781,113 buildings were burnt up, demolished and heavily damaged, viz:

- in Bosnia and Herzegovina.....	389,685
- in Serbia.....	141,593
- in Croatia.....	104,415
- in Slovenia.....	69,422
- in Orna Gora.....	55,040
- in Macedonia.....	14,958

Thus, more than 3,500,000 people were left without home and furniture.

By the destruction of installations and plundering exploitation of our mines, our mining industry was heavily damaged: 142 coal mines, 7 mines of lead and zinc, 8 mines of antimony, 9 of chromium, 10 mines of bauxite and many others. All smelting mills were either destroyed or severely damaged.

About two-fifths of our industry was destroyed or damaged. Textile industry suffered most - 53.4%, then chemical industry 52.2%, metal industry 49.8%, electric, 30.2%, food manufacturing industry 22%, industry of building material 17.5%; 75 power plants were destroyed, and besides, 8 tobacco factories, 8 factories of spirits, 2 sugar factories, 4 breweries and the only mint were damaged.

In addition to merciless requisition of agricultural products, without considering even the elementary needs of population, the occupiers devastated whole

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districts. Burning up villages, the occupiers destroyed about 289,000 farms together with cattle and inventory.

Agricultural machines destroyed during the occupation were the most precious for otherwise poor agriculture in Yugoslavia. So, 1520 tractors were destroyed or damaged during the war, 2480 locomotives, very many threshers and 485,000 carts. Buildings on stud farms and large Government estates were levelled to the ground and the inventory taken away. Woods in the vicinity of communications were cut down. Some areas that were wooded before the war are bare now; 175,000 hectares of forests are stony land now. In addition to 48 million cubic metres of wood, the occupiers took away 2,200,000 cubic metres of cellulosic and tannin wood which they had found prepared. Considering the importance of our lumber industry for our export trade, we can say that it was the greatest loss. The factory of cellulose in Drvar was demolished and 1150 saw mills.

Traffic suffered mostly. 976 locomotives were destroyed or taken away, 30,301 wagons or carriages and half of that number damaged. 57% of railway tracks were demolished, 68% of bridges, 60% of tunnels. 35 river passenger steamers were destroyed, 115 freight boats, 595 barges. Marine units, in so far as they had not escaped before capitulation and joined allied forces, were sunk or taken away. Big shipyards in Split, Kraljevic and Susak were damaged.

Motor vehicles were immediately requisitioned and taken away.

Other economic branches suffered heavy losses too. Many shops were demolished or plundered. Medical, educational, scientific and art institutions were demolished, historical monuments, documents, libraries destroyed or burnt up; their value cannot be paid by money.

So, otherwise low production in Yugoslavia was made still lower by devastation during the occupation.

Socialist Economy of PFRY

Immediately after the liberation of the country a radical restoration of all branches of our economy started. By an unparalleled working heroism the railway traffic was restored by the end of 1945, and during 1946 were restored and set in operation many industrial enterprises and mines, thousands of buildings were reconstructed in towns and villages and more than a million jutars of neglected land sown. By the end of 1946 the reconstruction was over and the level of agriculture and industrial production reached the pre-war capacity.

Agrarian reform was carried out in 1945, by which the land was taken not only from owners of large estates, but also from banks, Germans that emigrated and also from our citizens who did not cultivate land, and to rich peasants (farmers) land was left up to the maximum allowed by law. Agrarian reform gave the land to poor farmers or those who had had no land and realized their hope, and at the same time foundations of socialistic transformation of our country life were laid.

In 1947, the General Assembly brought the Five Year Plan to working people of Yugoslavia; by the execution of the Plan our country began to transform from an agrarian country to an industrial-agrarian state.

Geographic distribution of production in our country is solved by a consistent realization of four basic principles:

- the principle of equal distribution of production among all people's republics;

- the principle of bringing industry closer to its bases of raw material and areas of consumption of its products, with the aim of avoiding unnecessary transportation;

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- the principle of industrial development of backward regions, and
- the principle of strengthening defensive forces of our socialistic state.

Individual branches of industry, mutually connected in a technological process, are disposed within an area, forming individual complexes. So we have areas of metal, chemical, electro-industry. The area of metal industry covers the basin of raw material necessary for metallurgy. Such an area is Zenica - Vares. Branches of industry that spend much electric energy are in the vicinity of sources of electric energy.

Mining

FPRY is enormously rich in ore. Exploration is very active and new deposits are being discovered. At many places new ores have been found, but deposits are not exploited until technical preparations are completed.

Our country has all prerequisites for the development of metallurgy, as the basis of industrialization.

Jugoslavia is in possession of ores that are rare all over the world; without them war industry is impossible; therefore, they are called "strategic" raw material. Jugoslavia has 23 of 26 kinds of strategic raw material.

Coal

Coal is an important element for the chemical industry.

We have the following kinds of coal:

- lignite, most recently formed, with wooden structure well preserved, clearly visible; up to 4,000 calories;
- soft coal, partially composed of vegetable matter; produces from 5,000 to 6,000 calories;
- hard coal, the oldest formation, structure of vegetable matter can be seen only under microscope; produces over 7,000 calories.

Our most important coal mines now under exploitation are:

Lignite

Serbia: Kolubara, Kostolac mines (Novi and Stari Kostolac and Klenovnik), Kocovo, Ivanovo and Zajecar.

Croatia: Bregi, Ivanec mines (Ivanec, Broderevac and Ladanje), Koprivnica mines (Misulinovac), Konjarska mines (Gornja Konjarska and Novi Maretic, Donje Konjarska, Vucak, Spickovina, Martinec, Susobreg, Poljanica).

Slovenia: Velenje.

Bosnia and Herzegovina: Kreka basin (mines: Bukinje, Puracic, Dobrnja, Lipnica and Lukavac).

Crna Gora: Pljevlja.

Macedonia: Oslomej (at Kicevo).

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Soft Coal

Serbia: Aleksinac, Senjsko-Resavski mines (Resava, Senjski rudnik, Ravna Reka), Vrdnik, Bogovina, Soko, Jelasnica, Despotovac basin (Morava, Podalisane), Arandjelovac mines (Orasac, Cplenac), Mlava mines (Stamnica, Petrovacki, Leskovac, Melnica).

Croatia: Dalmatian mines (Silverio), Golubovac mines (Golubovac Novi, Golunovac Stari, Pragada, Krapina, Tabor), Konjarska mines (Ivanpolje, Zajezda), Rakovica, Medjumurke mines.

Slovenia: Trbovlje, Hrastnik, Zagorje, Senovo, Zebukovica, Laska, Liboje, Pecovnik, St. Janz, Kocevje.

Bosnia and Herzegovina: Tito-Banovici, Kakanj, Zenica, Breza, Mostar, Livno, Miljevina, Ugljevik-Mezgraja, Banja Luka, Suhaca.

Hard Coal

Serbia: Ibar mines (Jarando, Usec), Rtanj, Podvis, Vrska Cuka.

Croatia: Istria mines - Rasa, Podlabin, Pican.

Coke

Lukavac at Tuzla

Zenica (within the foundry).

The richest coal seams in Jugoslavia are in the territory of Bosnia and Herzegovina (5800 million tons), then Serbia (4400 million tons), Croatia (1100 million tons) and Slovenia (450 million tons). Coal seams are considerably poorer in Crna Gora and Macedonia, while Vojvodina and Dalmatia have only one coal mine each.

On basis of the production from 1949 reserves established would last about 950 years. Were the production to be increased five times, reserves would be sufficient for 200 years.

Since we have large reserves of soft coal and lignite, coke will be produced from such coal, because our scientists have invented technological process for such production. It is not profitable to transport lignite at long distances, so big power-stations will be erected at lignite mines and electric energy transported 300-400 km, while coke, and not lignite, will be transported by train.

Oil Fields

Slovenia: Donja Lendava

Croatia: Sumecani at Ivanic Grad, basin at Kutina (Gojilo); Dugo Selo at Zagreb.

Serbia: Banat, Belika Greda - Vrsac (under exploration).

Bosnia: Majevisa basin (under exploration).

Crna Gora: Uloinj basin - Buljarica field (at Petrovac na Moru) - Crmnica (under exploration).

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Cracking gives about 300 products (in our country about 40).

Stores of bituminous slates in our country are rich. Under the microscope it shows the remnants of algae, marine arthropods, fish and other organisms. Looks like coal. At a high temperature, a black oily liquor is extracted from bituminous slates - tar, which contains all the elements of crude oil. Refining of tar gives gasoline of the highest quality and a lot of paraffin. Stores in Serbia, in Aleksinac. Also in Macedonia, within the Bregalnica River water system, and in Dalmatia along the coast and in the islands.

Metals -----

Iron. The base of economy, and thereby of war potential, and also of economic policy and political independence of a socialist country, represents heavy industry. Metallurgy produces iron, steel and non-ferrous metals for heavy industry.

The basic task of iron-metallurgy is to extract iron from iron-ore, to refine it and to prepare it for use, while the task of non-ferrous metallurgy is to extract metals from all other ores.

For the production of iron are required iron-ore and coke: for a ton of unwrought iron: a ton of coke and 1.5 tons of ore. For the production of high quality steel the following is added to iron: manganese or chromium or molybdenum, and for special steel - wolfram or nickel.

Main stores of iron-ore are in Bosnia: Vares and Ljubija (during World War II the Germans paid careful attention to mines in Ljubija and protected them carefully); in Croatia: at Tomasića (north of Sunja), Beslinac, Petrova Gora, Samoborska Gora, the Velebit (under exploration); in Serbia: the Kopaonik and Majdanpek; in Macedonia: Slopea and Tajmiste at Kicevo.

Smelting mills: Zenica, Vares, Jesenice and Sisak; smelting mills at Store and Ilijas are under construction.

Foundries: Zenica, Jesenice, Store, Smederevo, Gustanj. Foundry at Niksic is under construction. A sheet-iron factory at Zemun and a foundry at Ilijas are under construction.

Copper. Copper is the most important of all non-ferrous metals; it is the key material of many industries. Without it there is no electro-technique, no automobile industry, no aircraft industry, not even manufacturing of machines, nor armament. With its rich stores of this metal Yugoslavia is on the top of the list in Europe.

Main stores are in Serbia: Bor, where metal is extracted from ore and refined, and Majdanpek, in which exploitation has not begun, but the prospects are great.

During the production of copper, a small quantity of gold and sulphur is also produced.

Lead. Lead is also a very important metal. Usually found in ore connected with the zinc ore. Lead is an indispensable metal for electro-technique, chemical industry, industry of building material and armament. By its stores Yugoslavia is in first place in Europe.

Main stores are in Serbia: Trepcia (one of the biggest mines in the world), then new mines Ajvalija, Novo Brdo and Jankevo in the vicinity of Pristina.

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The ore is also exploited at Rudnik, Leca - Medvedja (between Laskovac and Pristina) and Veliki Majdan at Zvornik. Crna Gora: Suplja Stena at Pljevlje in the spurs of the Ljubisnja mountain. Slovenia: Mezica basin. Macedonia: Zletovo. Bosnia: Srebrnica, Olovo, Kresevo, Fojnica (under exploration).

During the production of lead a considerable quantity of silver appears as a by-product.

Aluminium. Aluminium is extracted from bauxite ore in furnaces. Beside Hungary and France, Yugoslavia is the richest country in bauxite ore in Europe. Production of aluminium is coupled with a tremendous consumption of electric energy (for each kilogram - 20 kWh). Aluminium is a very light metal, but it is brittle, so it is usually mixed with magnesium and the alloy, Duraluminium, is used for the construction of aircraft. Aluminium is broadly applied in war industry, because a large number of articles are made of it, beginning with canteens and various parts of arms to aircraft.

Bauxite is found along the coast of the Adriatic Sea from Istria to the river Bojana and in the northern islands. A factory of alum is at Moste at Ljubljana. Aluminium is extracted at Lozovac at Sibenik and at Strnišće (Kidricevo) at Ptuj, where pure metal is extracted from ore. At Razina at Split a factory of aluminium has been constructed.

Nickel. Monopoly in extracting this metal is held by Canada. Small stores are in Serbia: Ba, Kadina Luka, Stragari (not exploited).

Mercury. Mercury is used in chemical industry, pyrotechnics, medicine, electro-industry and metallurgy. Yugoslavia is among the richest countries in the world in this metal, and third in Europe. The largest store that is being exploited is Idrija in Slovenia.

Pyrite. Pyrite is very important to the chemical industry and often contains gold. Majdenpek is a pyrite mine. Sulphuric acid is a by-product.

Very important are metals that, added in small quantities, improve the quality of steel or serve for the production of various alloys. Here they are:

Manganese extracted at Cevljanovic (Bosnia) and Cer at Kicevo (Macedonia).

Chromium. Stores in Serbia: Jezerina east of Prizren and Deva at Djakovica; Macedonia: Rabrovo at Valandovo, Lojana at Kumanovo and Radusa in the Sar-Planina mountain. Yugoslavia is the richest country in Europe and the sixth in the world by its stores of chromium.

Wolfram. Important for the production of special steel for armament and manufacturing of electric bulbs. The ore is exploited in the vicinity of Neresnica.

Antimony is extracted in the mines Krupanj, Zajaca and Bujanovac (all in Serbia); by the production and reserves Yugoslavia is in the first place in Europe; antimony is also available at Fojnica and Srebrnica, but it is not exploited there.

Gold can be found in the mines at Homolje and in the river Pek (at Neresnica, where it is exploited). Gold is a by-product of copper. There are silver-ores in Yugoslavia, but no mine gives exclusively silver. Silver can be found in combination with lead and zinc, whose ores contain about 120 gr. of silver per ton.

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Non-Metals

Magnesia is used in making firebricks in furnaces in which metal is smelted. Stores in Serbia: Goles in Kosovo Polje, Drenica at Vucitrn, Bela Stena - The Ibar valley (Jarando), Gornji Milanovac - Cacak basin (no exploitation).

Asbestos is used for non-combustible articles. Stores in Macedonia: Bogoslovce west of Stip; in Bosnia: Bosansko Petrovo Selo, and in Serbia Ervenik at Raska, Rujiste at Kosovska Mitrovica and Stragari at Arandjelovac.

Graphite is used for electrodes and for coating of metals; stores at Prokuplje and Pakrac.

Barite is used in chemical industry for the production of dyes, in medicine (barium sulphate), etc; stores: at Velika Kladusa and Kresevo (in Bosnia), Topusko and Riceo (Croatia) and Plese (Slovenia).

Marble is used for decoration of buildings and monuments; stores: the Vencac mountain, Ropcevo and Pec (Serbia), in the island of Brac and in the vicinity of Tetrovo.

Granite is used in house building, etc; stores: Jablanica, the Kopaonik, the Bukulja, the Cer, the Motajica, the Moslavacka Gora, the Pohorje, the Pelister, the Belasica and the Skopska Crna Gora.

Salt (common salt) is got by the evaporation of salt water at Ulcinj, Ston, Pag and in Istria or by the evaporation of salt springs at Kreka and Simin Han at Tuzla. A new salt mine is now open at the village Tusanj (at Tuzla) where salt is available as hard mineral.

Fireproof Clay is available at Arandjelovac where it is manufactured.

Marl, earthy, crumbling deposit consisting chiefly of clay mixed with calcium carbonate; used in cement industry. Best marl is in Dalmatia near Split and in Istria. Other stores that are exploited: the Fruska Gora (Beocin), Popovac at Cuprije, in the Sar-Planina mountain, at Labin and Pula in Istria, Anhovo at Gorica, Trbovlje, Podsused and Ralja.

Porcelain ware is made of our clay; when broken it is greyish; we do not have pure white clay (kaolin) to form the paste of porcelain.

Energetics

One of the basic prerequisites of the economic development of society is a wide base for the production of energy.

If we do not count human labour, basic sources of energy are divided into those that cannot and those that can be restored. The first group includes coal and crude oil, the second water power, wind and wood. Mankind spend now 93.7% of energy that is exhaustible, and only 6.3% of energy that is practically inexhaustible.

Germany, England, Poland and Sweden are ahead of our country by their sources of energy, Czechoslovakia, France, Italy, Rumania, Hungary, Bulgaria and others are behind.

In world reserves of energetic sources water power participates with 9.6%, and in our country with over 62.3%. Thus, the future of our energetics is water

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power, and then in coal.

The appearance of steam engine 1764 to 1780 in the production, 1803 with shipping and 1815 with railways, and also electrification at the end of the 19th century, caused the technical revolution in the development of productive forces. Today, however, atomic energy promises the same. Steam engines and electricity have made possible forming of gigantic industrial enterprises and tremendous concentration of production.

Coal as a source of energy has been known from ancient times. More than 120 years coal was the main source of energy. Since 1900 its importance has been constantly falling, while from 1900 to 1935 the importance of hydro-energy was increased 6 times.

New branches of industry, some branches of chemical industry in particular, and first of all the production of aluminium, require enormous quantity of electric energy. Owing to this, water energy is to be used for these branches of industry, especially in countries that are short of coal.

However, coal is no longer only a motive power. It is more and more used as coke in metallurgy and chemical industry (gasoline, etc).

At the beginning of the XXth Century crude oil and its derivatives appeared, so that coal lost its monopolistic position. Thenceforth, in many capitalistic countries collier owners have ceased to invest new capital in coal mines, and as a result, coal output is stagnant.

Naptha. We said that the production of coal is stagnant or even at a decrease. The situation with naptha is quite different. It belongs to products whose consumption is increasing because of an increased production of internal combustion engines (cars, aircraft, motor-boats), especially in war, because modern armies are motorized and their operations directly dependent on oil.

During the last decade the struggle for oil fields in the Middle and Near East reached a climax (oil fields recently discovered in Saudi Arabia and surrounding islands). American oil companies are exploring countries in South America.

There are considerable reserves of oil in our country. The regions from Lendava to the Rumanian frontier and around Ulcinj and Petrovac na Moru are being explored now.

Water Power. Water power depends on the declivity of rivers and quantity of water in rivers. If there are no natural waterfalls, they can be created by the construction of dams and artificial lakes. Water power is inexhaustible and will last as long as the Sun and the Earth, because it depends only on rain and snow.

Water power in Yugoslavia at medium water level, i.e. 9 months in a year, amounts to 9 million horsepowers, while the remainder three months it is 3 1/2 million HP. Tremendous water power lies in a majority of our rivers as the Drava, the Sava, the Soca, the Kupa, the Korana, the Una, the Sana, the Pliva, the Drina, the Lim, the Praca, the Zapadna Morava, the Ibar, the Neretva, the Vardar, the Radika, the Treska, the Donica, the Zeta, the Moraca, the Musovica Rijeka, the Ormojevica Rijeka and all other rivers of the Adriatic Sea water system, and also subterranean streams the Licanka (at village Lic) and the Lokvarka (at village Lokve) which falls down towards the sea --- Vinodol, forming an inexhaustible source of water power. From former Yugoslavia we inherited thermo-electric power stations in a capacity up to 360,000 kWh and hydro-electric power stations with the capacity of 180,000 kWh, or 2:1. When we finish all new hydro-electric power stations that we have started this proportion will be just the opposite (1:2). At the beginning of 1954 that proportion was: 57% of thermo-electric power stations : 47% of hydro-electric power stations.

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Geographic disposition of our hydro-electric power stations is as follows:

Hydro-electric power stations in operation

Croatia: Vinodol, Ozalj I and II on the River Kupa;

Dalmatia: "Tito" (Gubavica) on the River Cetina, Jaruga and Manojlovac on the River Krka (at Knin), Zavrclje (Mlini) at Dubrovnik;

Slovenia: Dravograd, Vuzenica, Fala and Mariborski Otok on the River Drava; Savica, Moste (at Jesenice), Radovljica and Medvode on the River Sava, Dobar and Plave on the River Soca;

Bosnia and Herzegovina: Jajce on the River Pliva, Bogatici at Sarajevo, Vlasenica and Mesici;

Serbia: Sokolovica, Saljasnica at Prijepolje;

Macedonia: Matka, Sapunica, Pesocani, Zrnovci and Dosnica;

Crna Gora: the Zeta waterfalls, the Musovica Rijeka and the Crnojevica Rijeka.

Hydro-electric power stations under construction

Dalmatia: Peruce at Sinj;

Slovenia: Vuhred;

Bosnia and Herzegovina: Jablanica on the River Neretva, Jajce I and Jajce II;

Serbia: Vlasina I, II, III and IV, Ovcar and Medjursje on the River Zapadna Morava, Zvornik, Raska and Kokin Brod at Nova Varos;

Macedonia: Vrutok and Vrben at Mavrovo;

Crna Gora: Zeta, Liverovici and Perucica on the upper Zeta.

In 1939 the output of electric energy was 1,100,000,000 KWh, and in 1954 it was 3,400,000,000 KWh, or 200 KWh per individual to 71 KWh in 1939.

Since the whole Yugoslav territory is an economic unit, all systems of electro-energy are being mutually connected, so that a republic gives electric energy to another; coal is distributed in a similar way: production of coal in all republics is developed to maximum, and then coal is distributed to be consumed there where coal mines of a republic are insufficient.

Jugoslavia is building now thermo-electric power stations to operate by the poorest coal - lignite, and even coal dust. Such a new thermo-electric power station is that at Kostolac (42,000 KWh).

Wood. The use of wood for the production of energy should not be allowed, because it is too precious either for house building or technical purposes or as raw material for the chemical industry.

Efforts are being made these days to save wood to the maximum as an extremely important export article (manufactured) and raw material for the chemical industry, because we spend huge quantities of wood as firewood. Hearths in villages and stoves in towns swallow wood in large quantities, as well as local industry. We spend up to 60% of the total amount of wood cut down. By its forests Germany is equal to Jugoslavia, but wood participates in its energetics with only 1.3%. Wood is the only source of energy that is spent over 100% of the

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accretion (per year).

Atomic energy. Atomic energy is still in phase of research; scientists of some countries in the West are trying to apply atomic energy for traffic and industrial purposes. In our atomic institutes the problem of applying atomic energy in economy is also studied.

PPRY, as we have seen, has at its disposal all sources of energy. Fundamentals for the development of energetics are contained in our economic plans which, first of all, tend to increase motive power of industry, agriculture and mining, i.e. branches of economy that are being rapidly mechanized. In every country technical equipment, and in connection with it, their total production, are estimated by the number of horse-powers and kilowatt-hours contained in the capacity of individual enterprises, done by an individual labourer. The importance of electrification for raising the standard of living in towns and villages is tremendous, because electric energy is applied with many activities of man: light, transportation, heating, cooking, radio service, theatres and cinemas, medical treatment, etc. It is difficult to improve conditions of life in backward regions if they have no electricity.

Industry

Jugoslavia is one of the most interesting countries from economical and geographical points of view, because geological and mining research has shown that its capabilities for a rapid and progressive development are great. It is capable of supplying itself with strategic raw material and, consequently, to become a country with a highly developed industry.

Heavy industry. Our economic plans realize strengthening of our economic independence from other countries and semi-colonial past of former Jugoslavia, levelling down sharp disproportions between large stocks and great diversity of natural wealth and economic-technical backwardness which we have inherited. The key for getting rid of such an inheritance lies in developing industry, that will produce means for production (machines) for all other branches of material production; heavy industry is the only branch able to do that. Economic backwardness of Jugoslavia was reflected not only in very poor energetics and insignificant production of machines, tools, etc., but also in an incredible narrow base of raw material in a majority of branches of the industry, very primitive agriculture, undeveloped connections between industrial and agricultural production, unilateral and unequal development of individual regions and, finally, because industry was far behind agriculture.

Our economic plans push the progress of development of productive forces on, changing the structure and disposition of production.

In order that the country might get rid of economic and technical backwardness, it was necessary to build up energetics first, then iron metallurgy, and after that non-ferrous metallurgy, which made the building up of other branches of industry possible.

Before the war Jugoslavia had three furnaces for smelting iron, one at Sisak, and two at Jesenice. The smelting mill at Jesenice is in a very bad strategic position, because it lies on the very frontier, and in the past it was a part of a metallurgic combination built up at the end of the 19th Century at Graz and Trieste for machine-tool industry. Jesenice has not its own base for raw material, because it was left beyond the frontier in Austria, so that raw material for Jesenice is to be transported from distant regions (Ljubija and Vares).

Our economic plans connect metallurgy and machine-tool industry, forming

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complexes within areas rich in raw material and sources of energy (coal and iron ore). Owing to this, the centre of iron metallurgy is being built up at Zenica, whereby this centre is connected to raw material and smelting mills at Vares, about 50 km from Zenica. Two furnaces (Siemens-Martin) have been built in Zenica and in Vares, each 600 tons capacity per day. New centre of iron production is Sisak, where two furnaces are under construction, each 150 tons capacity per day. Sisak takes raw material from Ljubija. In addition to a big smithery and foundry, a factory of seamless pipes has been built in Sisak. Then there are foundries at Zenica and Smederevo. Special steel is produced in Store and Gustanj. Foundry at Niksic is under construction. Factory of black tin is in Zemun.

We are constructing new furnaces and many other industrial and energetic installations (especially hydro-electric power stations) by our own forces. We produce coke from our lignite, which is important for the development of iron metallurgy. In 1948 we imported coke for 635 million dinars, and in 1949 for 610 million. In addition to coke mill at Zenica, a big coke-chemical factory has been built up at Lukavac at Tuzla, where are hugestores of lignite in coal mines Puracic, Kreka and Bukinje.

High furnaces produce unwrought iron that is hard and brittle, unsuitable for manufacturing. It is melted in Siemens-Martin furnaces and the product is steel; old iron and other elements are added (manganese, chromium, wolfran, nickel, etc).

Good results are attained in the production of steel of high quality at Gustanj and Store; they produce about 50 kinds of special steel that we imported before.

War industry and other branches of industry need machine tool factories. In Zeljeznik at Beograd and Zagreb two machine tool factories have been constructed. These two factories supply our industry with various machine tools.

Machinery includes production of locomotives, loccmobiles, railway carriages and wagons, steam kettles, hydro-mechanic equipment, mining equipment, auto-mobiles, tractors, Diesel engines, transformers, batteries and other installations that are indispensable for industrialization and electrification of the country.

After the war we have constructed: a factory of installations for food and chemical industry, a machine-tool factory, a factory for fans, a factory of steam-engines at Zagreb; at Bezanija (a suburb of Zemun) a foundry, a big factory producing installations for textile, food and chemical industries and a factory of farming-machines; a factory of mining equipment and hydraulic installations at Mis; a factory of textile machines at Cakovec; a factory of tools for cutting metals at Novi Sad; a factory of tools at Trebinje (not finished); a factory of installations for the exploitation of crude oil at Sesvetski Kraljevac at Zagreb; a factory of motion picture projectors; a factory of bicycles at Subotica and Sarajevo; a factory of medical instruments and ball bearings in Beograd; a factory of tractors at Rakovica near Belgrade; automobile factories at Tezno near Maribor and at Priboj na Limu; a foundry and a machine factory at Stup near Sarajevo; "Litostroj", a factory of hydraulic machines (turbines) at Ljubljana and a factory of hydro-mechanic equipment at Maribor; locomotive, wagon, carriage, steam engine, bridge factories and factories of equipment for factory halls and installations for cement and wood industries at Slavonski Brod, Smederevska Palanka and Kraljevo*; factory of heavy mining equipment at Krusevac; a zinc factory and a factory of enamel ware at Celje; factory of farming machines at Petrovaradin; foundries and machine factories at Skoplje and Osijek; a big factory for the production of all copper and brass products (tin, wire, seamless pipes) at Sevojno near Titovo Uzice;

* Factories at Slavonski Brod, Smederevska. Palanka and Kraljevo were built before the war, but they are enlarged and modernized now.

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a copper and zinc smelting mill is under construction at Sabac; a factory for the production of copper and lead cables at Svetozarevo (Bresje); aluminium factories at Strnisce near Ptuj and at Razine near Sibenik; a factory of seamless pipes at Sisak.

Zagreb is the centre of electro-industry, where are produced: electro-motors, generators, electro-material, batteries and bulbs; a factory of cables, copper conductors, copper bars, pipes and ropes at Novi Sad; a factory of radio and roentgen tubes at Mis; a factory of radio equipment and high frequency installations at Ljubljana; a factory of radio sets and equipment at Belgrade; a factory of electro-material at Zemun; electric instruments and telephones at Kranj; factory of electro-motors at Subotica.

Chemical industry. A tremendous success of technical explorations and achievements during the last 100 years has served as a wide base for the development of the chemical industry, which means a higher stage in the development of productive forces.

Chemical industry produces over 1,200,000 tons of artificial rubber today in relation to 2,000,000 tons of natural India rubber. The capacity of German industry of synthetic oil was 6 million tons in 1939, or far more than all Rumanian fields produced at that time.

Developed chemical industry provides the economic progress and political independence of a country, improves agriculture and strengthens defensive forces of an army.

Enormous mineral wealth of Yugoslavia is a firm base for the development of the chemical industry. Salt, barite and limestone are of special importance for the development of chemical industry among non-metallic ores. Production of caustic soda and ammonium chlorid and also fabrication of various plastic masses depend on salt. Barite is used in industry of dyes, leather, textile, rubber, glass industry, pyrotechnics and paper industry.

Calcium carbide is produced from limestone and coal with co-operation of electric energy. It produces calcium cyanamide, an important fertilizer, and acetylene which is used for the production of plastic mass, synthetic rubber and acetone, and acetone serves for the production of many other solvents. Yugoslavia should try its best to produce carbide, because its stocks of limestone are large, especially in Dalmatia, Slovenia, Istria, Herzegovina and Crna Gora.

We have enough raw material of vegetable origin for our chemical industry; various industrial plants, simples and green-wood trees.

In addition to various plants, we have raw material of animal origin for this industry: fat, oil, bones, etc. Glue is produced from bones, fertilizers from ashes of bones, medicaments from bone-coal.

For the production of cellulose we do not have sufficient quantities of soft wood, so it is also made of reed from our northwestern islands (Unije, Srakane and Susak).

The production of sulphuric acid, as the base of chemical industry, has been very low, because pyrite has been exported to countries with chemical industry highly developed.

Products of dry distillation of wood are important in the chemical industry: we have two factories in Teslic and in Belisce at Valpovo. They produce: charcoal, tar, acetone, methyl alcohol, acetic acid, crescote, carbonyl, etc. The factory at Dobrun at Visegrad produces terpene, and factories in Zagreb, Skoplje and Belgrade dyes; ay Celje and Medvode organic dyes (aniline).

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A great success of our new chemical industry is the production of photo-paper, photo and roentgen films, typewriter ribbons and carbon paper in Zagreb. There is also a new factory of plastic mass at Kastel-Suourac at Split.

The following factories have been built: at Sabac and Subotica factories of chemical heavy industry (sulphuric acid, fertilizers, copper sulphate - blue vitriol, peptin); at Hrastnik and Krusevac factories of similar products; at Celje a factory of blue vitriol, chrom-alum and enamel; at Ruse near Maribor are produced carbide, azote and ferrochrome; at Sibonik, Jajce and Dugi Rat are electro-chemical enterprises producing cyanamide, carbide, caustic soda, ferro-alloys and ferromanganese; at Gorazde a factory of azote fertilizers is under construction; at Lukevac near Tuzla caustic soda, ammonia and bicarbonate; at Osijek and Dolac matches; at Djurdjenovac and Sisak - tannin; at Prijedor, cellulose; at Veboe, Radece, Rijeka, Kolicovo, Belgrade, Cacak and Slati Vrh (near Maribor), paper industry; at Videm-Krsko, Goricane, Domzale and Zagreb, cellulose for paper; at Paracin, Arandjelovac, Hrastnik, Rogaska Slatina, Straza (on the river Sutla at Rogatec) and Pancevo, glass; in Zagreb a factory of special optical glass; at Skoplje a factory for the production of nicotine; at Rijeka, Sisak and Bosanski Brod enterprises for purification of crude oil; factories of medicaments at Zemun, Belgrade, Zagreb and Ljubljana; at Skoplje a factory of alcaoides - opium.

Food industry. This branch of industry is very complex, considering raw material it is using. In the main, food industry is divided into: (a) milling industry dealing with the grinding of cereals; (b) oil industry (olive mills); (c) sugar industry; (d) industry of fermentation; (e) industry of milk products; (f) canned food industry.

Sugar factories are at Zupanja, Zrenjanin, Novi Vrbas, Belgrade, Cuprija, Osijek, Crvenka and Belje; at Brcko, Urosevac, Vrbas, Zrenjanin, Zagreb, Ljubljana and Titov Welles are olive-mills; at Omis, Bakar, Gruz, Zadar, Kotor and Bar are also olive mills; at Kijevo near Belgrade, Sabac, Novi Sad, Skoplje, Varazdin, Mostar, Banja Luka and Doboj are factories for canning fruit and vegetables; at Kragujevac, Svetozarevo, Mladenovac, Velika Plana, Subotica, Sid, Sestete near Zagreb, Petrinja, Maribor, Murska Sobota and Banatsko Rankovicevo are abattoirs with installations for canning meat; at Rovink, Vela Luka, Lastovo, Split, Komiza, Bela, Zadar and in Boka Kotorska are factories for canning fish; at Osijek and Zupanja are factories of powdered milk; at Jabuka near Pancevo is the factory that uses maize as raw material producing starch, syrup for drugs and alcohol; two factories of spirits are in Belgrade, and one in Crvenka; besides, there are 22 factories of spirits; there are 23 breweries; a factory of liquors is at Zadar, and a factory of champagne and first class export wine is at Radgona.

This branch of industry produces yeast and raw material for penicillin, too.

Textile and other branches of industry. With the exception of rubber industry, that has not been known more than 150 years, textile and leather industries are very old, as old as the food industry. Today, there are more than 30,000 articles produced by the rubber industry.

Cotton is the most important plant for textile industry. It was wool that reigned in the textile industry up to the end of the 18th century. New spinning mills under construction are in Macedonia, Herzegovina and Kosmet. Bosnia and Herzegovina and Macedonia are increasing the capacity of their weaving mills, especially for wool they are producing in considerable quantity.

Considering that the rubber industry depends on import; it is not so developed as other branches of industry. For a further development of rubber industry it is essential for us to create a base of raw material in the country. The construction of a factory for the production of synthetic rubber is being prepared.

Textile factories are at: Trzic, Litija, Skofja, Loka, Jarse, Maribor, Kranj, Paracin, Ordelica, Prijepolje, Belgrade, Zemun, Leskovac, Pristina, Cakovec, Varazdin, Zagreb and Duga Resa; a factory of nets and curtains is at Zrenjanin, at

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Tetovo and Skoplje industry of woolen products; at Osijek, industry of flax; at Novi Sad, industry of silk (natural); new cotton mills are at Stip, Sinj, Mostar and Pristina.

In all people's republics there are 22 leather factories.

Rubber industry is most developed at Borovo, Krenj, Nis, Pirot, Zagreb and Rakovica.

Tobacco factories are at: Nis, Sarajevo, Banja Luka, Mostar, Titograd, Zagreb, Rovinj, Zadar, Ljubljana and Skoplje.

Lumber and furniture industry is developed at the following centres: Zavidovici, Zivinice, Foca, Donji Vekuf, Hadzici, Kranj, Celje, Maribor, Sloven Gradec, Kocevje, Delnice, Ogulin, Belisee near Valpovo, Djurdjenovac, Karlovac, Pakrac, Virovitica, Sisak, Susak, Sremska Mitrovica, Zabrez, Gorica, Elazuj near Sarajevo.

Cement is produced at: Becoin, Popovac near Cuprija, Skoplje, Podsused, Pula, Koromacno near Labin, Omis, Trbovlje and Anhovo (north of Gorica) and especially at Split.

Porcelain is produced at Arandjelovac, Stup near Sarajevo and at Zagreb.

Agriculture

Cultivated areas in all parts of the world are fairly limited, but they can be enlarged by melioration of vast swampy areas.

The whole territory of Yugoslavia is divided as follows:

Plough fields and Gardens	30.2%	Cultivated	
Orchards	1.5%	land	Agricultural
Vineyards	1.1%		land
Meadows	8.4%		
Pastures	17.4%		
Fish ponds	0.1%		
Forests	33.1%		
Swampy land	0.3%		
Barren areas	7.9%		
Total FFRY:		100.0%	

Agriculture produces articles of large consumption that serve as food, clothing, fodder and those that are used in industry. These articles are produced by agriculture together with fruit-growing and viticulture, cattle-breeding, forestry, hunting and fishing, and are manufactured by food, textile, leather, lumber and rubber industries.

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In addition to vegetable, agriculture produces animal-products: meat, wool, fat, milk, eggs, skins, etc. Cattle-breeding products are important raw material for industry.

Fauna depends on Flora. The lack of flora decreases the number of animals, grass eaters.

The influence of climate and other geographic elements on flora and on cattle breeding is very important. But the yield does not depend only on these elements, because it can be lowered due to wrong cultivation of land (poor cultivation, bad seed, lack of fertilizers, etc).

Fertile land is not only a natural condition, but also the basic means for husbandry. Land and soil are not equal in all countries, because they depend on geologic structure and relief of ground, and especially on climate and water regime. There are countries in which not more than 2-5% of fertile soil are cultivated; on the other hand, in other countries every square foot is cultivated.

In our country there are areas of bare karst and swamps. Of the total area, about 2,39 million hectares require hydro-technical measures, drainage. About 1.63 million hectares have already been meliorated, while 762,000 hectares remain to be meliorated. Protection of our agriculture from drought is an important problem for the whole country, for southern regions and Pannonia Basin in particular. Large share of meadows and pastures in the total cultivated area is the result of predominantly mountainous terrain in our country. So, meadows and pastures are 83.2% in Crna Gora, 67.2% of Slovenia, 51% of Croatia, 50% of Macedonia and Bosnia and Herzegovina and 41.8% of Serbia. Plough fields and gardens in Serbia (without Vojvodina and Kosmet) are exactly a third of its territory (33%) and in Vojvodina 70.3%.

The penetration of capitalism to the country and rapid increase of population caused the impoverishment of our small land-holders. Since a slow development of industry and other branches of economy made the inflow of farmers from the country to towns impossible, they had to remain in the country and caused division of otherwise small farms. Large estates strengthened on account of small ones. Capitalism quickened the process of impoverishment of small holders and created proletariat in the country. Supply of labour was greater than demand, since poor farmers became tenant farmers, which caused low wages. However, agricultural crisis in all European countries was most acute after 1931, and considering that the population of former Yugoslavia was increased by about 2 million during the last ten years before the war, the situation of poor farmers at the end of 1940 was far more difficult.

New agrarian reform in Yugoslavia has provided that land belongs to those that cultivate it. 240,000 poor farmers' families became owners of 439,000 hectares of cultivable land. Machines and tools and other inventory abandoned by the Germans of their collaborators were divided among these farmers. The last agrarian reform finally liquidated large private estates.

Before the war, the Government held only 77,000 hectares divided among 8 large estates; at the beginning of 1950 there were 858 such estates.

Our collective farming, as one of the basic forms of socialistic transformation of the country, is being developed on the principal of unconditional voluntariness, free of elements of administrative management and based on a free competition of economic forces.

A predominantly natural agriculture is reflected in domination of cereals over other cultures, especially industrial plants, then over fruit growing and viticulture. Of the total value of agricultural production in 1949 crops were 59.2%, fruit growing only 2.5%, viticulture 3.9%, cattle breeding 33.5%, fishery 0.9%. In 1952 about 500,000 hectares were overgrown with industrial plants to

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203,000 hectares in 1939. This means a higher structure of agriculture, because cereals were left to be consumed by producers themselves, while a comparatively small quantity went to market. On the contrary, industrial plants were brought to the market almost 100%. Fruit and vines can be cultivated on the soil that is unsuitable for cultivating cereals.

The base of raw material for our food industry has been enlarged to a considerable extent and will be enlarged in the future, too. In recent years the areas under sugar beet have been enlarged from 47,000 to 100,000 hectares, under sunflowers from 19,600 to 75,000 hectares and under soybean from 3,500 to 25,000 hectares. The areas in which industrial plants are grown are mutually disconnected. In Vojvodina, Eastern Slovenia and Posavina with Macva are widely grown sugar beet, sunflower, soybean, rape and hemp. Hop is widely grown in Slovenia (the valley of the River Savinka), and chicory in Croatia (1,000 railway wagons in 1950). Macedonia is the main producer of poppies and in our sub-tropical region which, in addition to cotton, produces first-class tobacco, rice and similes (these are also produced in Dalmatia).

Cattle breeding. In mountainous regions of our country sheep breeding is the basic branch of cattle breeding, because there are many good and rich pastures. Cattle, horses, pigs and fowl are not raised intensely in these regions, but in lower regions where conditions are more favourable. Splitting or otherwise small farms caused intensity in raising sheep and fowl on account of cattle breeding and even pig breeding. After the liberation we did not find more than 50% of the pre-war number of animals. Measures have been taken for the increase of the stock not only up to the pre-war level, but more than that, and that is achieved.

Fishery. Fishery is a branch of economy including pisciculture, fishing and fish industry. Centres of our fishing trade are in Istria (Rovinj) and northern parts of the Littoral. Fish is an important article, because it contains fat and albumin. Besides, there is no trouble in feeding them.

Without a proper developed agricultural production, it is impossible to produce necessary quantities of raw material for food industry, textile and leather industries.

In former Yugoslavia cattle breeding was gradually falling off because of the lack of fodder.

Forestry is a branch of agriculture.

It was estimated that before the war that woodiness of Yugoslavia was 31.2% to 37.4% in Austria, 33.2% in Czechoslovakia, 28.3% in Bulgaria, to say nothing of countries poor in forests, as for example Italy with 9.9%, England with 4.5%. Onetime, our country was densely forested, but many invaders devastated our forests for centuries. Today, 33.1% of our territory is overgrown with trees, in spite that occupators exploited our forests mercilessly during World War II. Woodiness in individual republics is as follows:

Slovenia.....	41.2%
Kosmet.....	39.1%
Bosnia and Herzegovina.....	37.4%
Croatia.....	33.7%
Crna Gora.....	32.5%
Macedonia.....	20.7%
Serbia.....	19.1%
Vojvodina.....	6.4%

The lack of woods in Vojvodina is the result not only the influence of eastern climate of steppe with low rainfalls (500-600 mm of rainfall per year), but also of relief - vast plain and, finally, of humus - porous land.

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By the structure, 57% are mixed forests (41% deciduous and 16% coniferous), 20.3% beech, 10.4% oak trees, 2% pines, 10.3 juniper trees and fir trees. All low woods are younger than 40 years, and of high trees 54% are young (1-40 years), 33% are middle age (41-80 years), while 13% are older than 80 years.

Up to the beginning of this century our country was thickly forested, because regeneration was much greater than internal consumption. However, during this century over 600,000 hectares of woods have been cleared or about 25% of forested areas only in Bosnia and Herzegovina, and about 15% of all woods in Serbia. Macedonia was deforested long ago, while Dalmatia was transformed into a karst region by Venice rulers. The present situation hardly provides the balance between yearly regeneration and our needs.

The whole territory of our country is 29,658,900 hectares, of which forests cover 8,744,725 hectares, which means 0.47 hectares per inhabitant. Thus, Yugoslavia is an export country, because import countries are those with less than 0.35 hectares per inhabitant. Wood was one of basic export articles before the war, and today, in the period of intensive industrialization, export is indispensable, because for export articles we get machines and means for reproduction.

When dealing with the exploitation of forests, the following factors are important: average mass of wood and yearly regeneration per hectare in average. Taking into account thickets, average mass of wood per hectare in Yugoslavia amounts to 109 cu. m. or in total 798,120,000 cu. m. The average regeneration of this mass is 1.93 cu. m. per hectare in a year, or in total 14,165,000 cu. m. The share of low woods is considerable (16%), and in high woods, young, virgin trees are predominant. Systematic efforts are therefore required in order to improve the present situation and adapt lumber industry to the present condition of woods. With the development of industry forestry is to be changed, too. First of all, consumption of firewood is to be decreased and consumption of technical wood to be increased.

Wooded areas with better trees (coniferous and oak) were before the war exhausted to a considerable extent, and especially during the occupation when forests were cut down in areas easy to approach. Woods were devastated also because farmers cleared land in order to get cultivable land.

Before the liberation woods were exploited for industrial purposes by big private and Governmental enterprises. About 3/4 of the mass of wood were exploited by private enterprises, and only 1/4 by the Government. The share of foreign capital in this branch of industry was estimated at 50%. Capitalists were attracted by large areas of oak forests in Slavonia and Srem overgrown with best oak trees in Europe and also those in Slovenia, Croatia and Bosnia.

After the war forestry is mechanized and modernized.

In our country unforested areas, or areas with small woods are as follows:

Macedonia - central part, Pelagonija, Zegligovo, the Skopje and the Tetovo lowland areas;

Crna Gora - southern and southwestern parts, the Zeta and the Niksic lowland areas, the valley of the River Zeta, the Cijevna valley, the region from Boka Kotorska to the River Bojna (with the exception of some small areas along ridges), within the area of the Sinjajevina - the Durmitor - the Treskavac regions above 1500 m are bare;

Herzegovina - with the exception of northern and northwestern areas, the rest of the territory is either thinly wooded or entirely bare;

Dalmatia - except the areas north of Knin, northeastern of Split and the region north of Vrgoracko Polje and eastern of Imotsko Polje, all other parts are bare;

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Serbia - northern areas are thinly wooded, and in the south to the line: The Cer mountain, Koceljivo, Lajkovac, Arandjelovac, Paracin, Despotovac, Petrovac na Mlavi, Golubac, basins of Prokuplje, Nis, Leskovac, Pirot, Knjazevac, Zajecar;

Kosmet - Kusovo Polje and the area north of Prizren;

Vojvodina - the whole region except the Fruska Gora and narrow belts along the Danube and the Sava;

Croatia and Slovenia - the whole coastal area of the Croatian Littoral from Rijeka to the mouth of the River Zrmanja. Thinly wooded areas are around Bjelovar, Daruvar, Banova Jaruga and Podravina at Cakovec, Varazdin, Koprivnica and Virovitica;

Istria - the area west of the line Piran, Pazin, Labin;

Slovenia - karst areas along the sectors Gorica, Ajdovscina, Sezana and Ljubljansko Barje;

Islands in the Adriatic Sea - all except Hvar, Korcula, Lastovo and Vis;

Bosnia and Herzegovina - Samerija; the basin Breko - Samac; the Lijevo area; Kupresko Polje, Livanjsko Polje, Duvanjsko Polje and Glamočko Polje.

People's authorities, supported by the people, afforested from 1949 to 1953 large areas in Dalmatia, Herzegovina, Crna Gora, Macedonia and Northern Serbia.

On basis of analysis of conditions of our economy and economic potential, the latter being the result of geographic factors and working enthusiasm of people, we can conclude briefly:

Agriculture. Husbandry: present cultivable area will be sufficient to produce raw material for food and manufacture to meet our requirements without any import; this will be achieved by further socialistic reconstruction of country life, mechanization and chemicalization of cultivation of land. Some products are exported. Fruit, grapes and wine will be important export articles;

Cattle breeding: due to decreased basic stock of cattle, as the result of long occupation of the country, there was no export immediately after the war. Lard, skins and wool for food and industry will be imported for a certain period of time.

Forestry: Wise economic policy will enable us to develop the lumber industry and export of wood;

Fishery: Collective fishing will play an important role in our economy;

We are exporting considerable quantities of canned fish (sardine, tunny, eel in particular).

In case of war our agriculture will be able to meet our requirements and to make us free from any import, on condition that we defend our regions under cereals.

It is an important characteristic of Yugoslavia that main agricultural areas and tracts under cereals (Eastern Slovenia, Srem, Backa, Banat, Northwestern Serbia and Pomoravlje) lie across the periphery and that they are vulnerable being exposed to possible attacks from the north and from the east.

Mining. We mentioned before that our country has 23 of 26 articles of

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strategic raw material (iron, copper, lead, zinc, bauxite, magnesia, chromium, manganese, antimony, barite, wolfram, gold, mercury, molybdenum pyrite, asbestos, etc). Our country is provided with vital ores, and when it meets its own requirements, considerable quantities can be exported. Even in case of a blockade we have sufficient sources of energy and fuel and other mineral raw material (except some salts required in the chemical industry).

In case of war, the following basins of ore and energetics are in danger:

- the basin in the valleys of the rivers Timok and Pek;
- the Zletovo area;
- Idrija mines;
- Mezice mines;
- Donja Lendava oil fields;
- the Koprivnica coal basin;
- all hydro-electric power stations on the Soca and the Drava and also Vlasina.

Industry. Metal manufacturing industry and industry of machines have recently begun to produce first products, making our country free from importing its articles. Import of machines will be gradually decreased.

Chemical industry does not meet all our requirements, since it is in full swing now.

Lumber industry meets our requirements and produces many articles for export.

Textile and leather industries depend on the import of raw material. Otherwise, the capacity of these branches of industry would be able to meet all our requirements and even produce articles for export, if they had 100% of raw material provided (cotton, wool and skins).

Food industry meets our requirements and produces some articles for export.

Military industry: depends on the quantity of steel and other metals produced by our metallurgy. New high furnaces for smelting mills and Siemens-Martin furnaces for the production of high quality steel are installed. They will soon produce sufficient quantities of metals, and coke mills at Zenica and Lukavac sufficient quantities of coke from our own coal. The base of energy for our military industry is secured.

Our military industry, although very young, has been successful from the beginning. It has produced new guns, mortars and military equipment.

Military industry is being built up in areas that are naturally protected.

Our whole industry is prepared for a quick transition to war output.

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