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# Yugoslavia

April 1973

NATIONAL INTELLIGENCE SURVEY

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Military Geograph

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# YUGOSLAVIA

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*This General Survey supersedes the one dated August 1969, copies of which should be destroyed.*

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# Military Geography

## A. Location and description (U/OU)

Fronting on the eastern shores of the Adriatic Sea, Yugoslavia occupies a strategic crossroads position in the Balkan Peninsula (Figure 16). Because the country controls major lines of communication important to both Communist and Western nations, its location imposes upon it a hazard of involvement in any major military conflict in the Balkans. The valleys of the Drava, Sava, Danube, Velika Morava, and Nisava<sup>1</sup> rivers provide the shortest natural land routes between Western Europe and the Middle East; the Velika Morava, the Juzna Morava, and Vardar valleys form an important north-south corridor to Greece and the Aegean Sea. In addition, the location of the country makes it potentially important in missile and air operations between the southwestern part of Eastern Europe and the countries bordering the western Mediterranean and northwest Africa, particularly in relation to the disposition of early warning systems. Belgrade, the capital, is within 500 nautical miles of the strategic Dardanelles and Bosphorus and less than 1,400 nautical miles from all of the political capitals, important industrial centers, and seaports of Europe. It is slightly less than 1,000 nautical miles from Algiers and Cairo, about 1,500 nautical miles from Teheran, and approximately 1,700 nautical miles from the oilfields near the Persian Gulf.

An irregularly shaped, elongated country, Yugoslavia occupies a northwest-southeast trending area of about 98,700 square miles, a size comparable to that of Indiana, Ohio, and West Virginia combined. It has a population of about 20.6 million. The country is the largest in the Balkans and is about 550 miles<sup>2</sup> long; its greatest width is about 260 miles. The weakness of such a shape is not only its length, which requires long lines of communication, but also the length of its periphery, which makes the country difficult to defend.

<sup>1</sup>For diacritics on place names see the list of names on the apron of the Terrain and Transportation Map, the map itself, and maps in the text.

<sup>2</sup>Distances are in statute miles unless nautical miles are specifically indicated.

## 1. Topography

Yugoslavia is predominantly a country of hills and mountains (Figure 1). The only significant lowland is the large plain in the north. Except for this lowland, the country is made up of rugged highlands having numerous mountain ridges and peaks, narrow steep-sided valleys, and scattered, nearly level basins; elevations reach nearly 9,400 feet in the northwest. Much of the rugged terrain along the Adriatic Sea and extending approximately 100 miles inland consists of karst topography, which is characterized by underground drainage and caverns, shallow sinkholes, deep narrow valleys, cliffs, and poljes (depressions having relatively flat floors and steep sides (Figure 2) but no outflowing surface streams). Throughout the highland area brush and scrub are dominant (Figure 3), and deciduous and coniferous forests generally occur only on the upper slopes of the hills and mountains. The low-lying nearly flat to rolling plains and scattered upland areas in the northern part of the country contain the largest concentration of culture features. Intensive cultivation of small grains, corn, and vegetables is carried on, and canals and irrigation and drainage ditches are common. Closely spaced urban and rural settlements are connected by a network of roads and railroads. Cities other than Belgrade and Zagreb are generally small, have densely built-up cores, and include residential suburbs that have concentrations of industry. The hills and mountains are sparsely populated, and culture features consist mainly of scattered buildings and roads. There are a few towns in the larger basins and valleys. The country is well drained by numerous rivers except in the karst area, where underground drainage is characteristic. Surface drainage is primarily by meandering wide and slow-moving streams on the plains and by swift streams winding through deep valleys and gorges in the hills and mountains.

Earthquakes have periodically claimed heavy tolls among the Yugoslavs. All of the country is subject to frequent earthquakes; damaging or destructive earthquakes can be expected to occur in most parts of the country. The most recent major earthquake

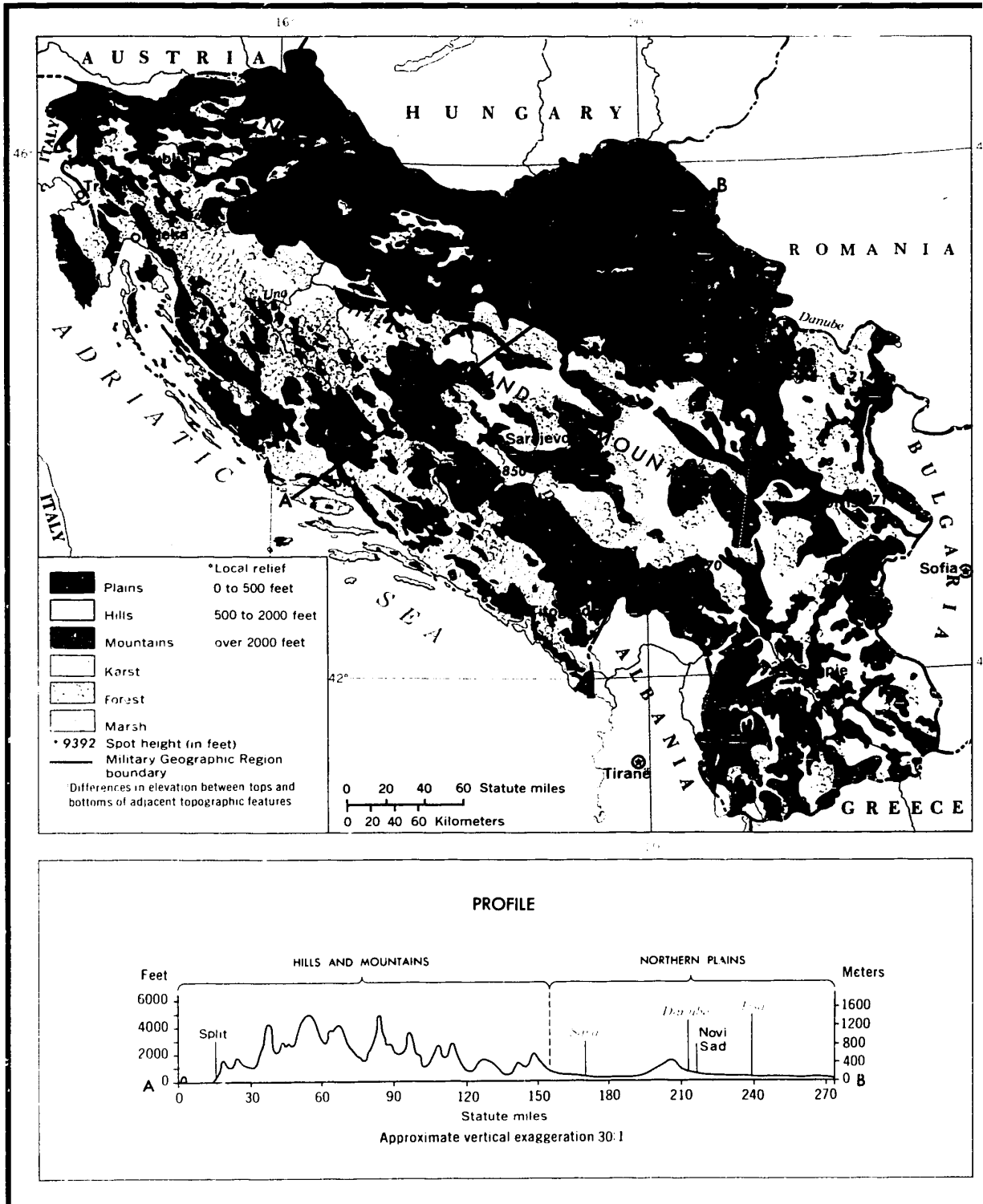


FIGURE 1. Military geographic regions and terrain (U/OU)



FIGURE 2. Cultivated floor of a polje in southern Dalmatia (U/OU)



FIGURE 3. Brush and scrub on hills and mountains in southern Yugoslavia (C)

occurred in the northwest region in October 1969, causing considerable structural damage and some deaths.

## 2. Climate

Yugoslavia has a wide variety of climatic conditions. A Mediterranean climate of mild, rainy winters (December through February) and warm to hot, less rainy summers (June through August) prevails in a narrow zone along the coast. Over the plains in the north, the climate is continental; winters are cold and have light precipitation, frequently snow, and summers are hot and showery. In the rugged hilly and mountainous interior between these two regions, the climate has some of the characteristics of both the Mediterranean and continental regimes; however, because of differences in elevations and exposure, climatic conditions vary markedly from place to place. In general, temperatures are lower year round, and snow cover usually lasts longer in the highlands.

In most of the country, cloudiness is greatest and relative humidity highest in late autumn and winter; both reach minimums in summer and early autumn. Thunderstorms are most frequent in summer. Mean annual precipitation ranges from about 20 inches to over 180 inches (Figure 4). Precipitation varies greatly between seasons in some parts of the mountains. Poor visibility (less than 2.5 miles), due to fog or snow, is common in late autumn and winter over the northern plains and in the mountains; it occurs on about 50% of the early morning observations in some sections. Visibility along the coast is seldom restricted. Surface winds are generally quite variable; however, some

sections of the coast have persistent northeast winds in all seasons except summer. Land and sea breezes are common in summer along the coast. Several strong, cold, turbulent local winds occur at intervals, usually in winter; the *bora* along the coast and the *kossava* over the eastern lowlands are the most important.

## B. Military geographic regions (C)

Differences in the terrain are the basis for dividing the country into two military geographic regions—the Northern Plains and the Hills and Mountains (Figure 1). The combination of environmental conditions within each region would have a relatively uniform effect on military operations, but there would be marked differences between the two regions.

### 1. Northern Plains

The plains in the north are drained by large rivers and are moderately populated and intensively cultivated. Most of the eastern half of the plains and the wide valley of the Sava river, which flows eastward near the southern boundary of the plains, are nearly flat and mostly between 250 and 325 feet above sea level. Interstream areas are commonly less than 70 feet above adjacent valley bottoms, and slopes are mostly less than 2% (Figure 5). Along the southern margin and in the west between the Sava and Drava rivers the plains are mainly rolling; interstream areas are mostly less than 400 feet above adjacent valley bottoms, and slopes are usually less than 10%. Small scattered hill and mountain groups rise to a maximum of about 3,400 feet above sea level north of Zagreb; crests are



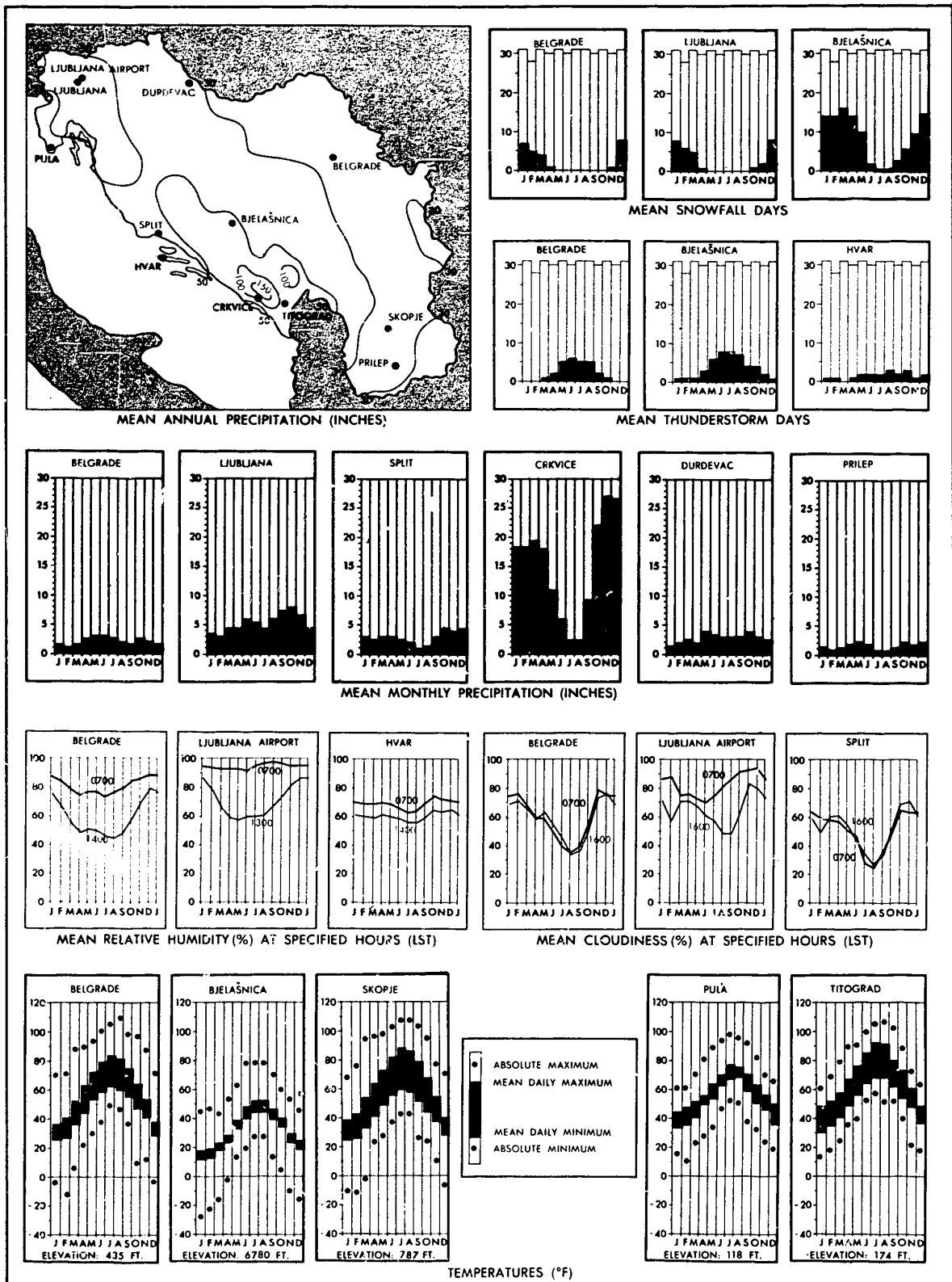


FIGURE 4. Precipitation, snowfall days, thunderstorm days, relative humidity, cloudiness, and temperatures (U/OU)

900 to 1,600 feet above adjacent valley bottoms, and slopes are 10% to more than 30%. In general, the largest rivers, the Danube, Drava, Sava, and Tisa, are wider than 500 feet and deeper than 6 feet year round. There are many small, closely spaced agricultural villages and market towns in the plains. The main urban concentrations are along the courses of important rivers. Belgrade has about 845,000 inhabitants, Zagreb slightly over 600,000, Skopje, Sarajevo, and Ljubljana over 200,000 each, and both Novi Sad and Rijeka have populations of more than 130,000. The principal populated places are linked by railroads and roads.

and would generally cause wheeled vehicles to be roadbound. Cover from small arms fire and concealment from ground and air observation would be best provided by buildings in urban areas, numerous small villages, and in scattered rural farmsteads and other buildings. Seasonal concealment, from early May to mid-October, would be provided by scattered deciduous forests and by groves of trees along the roads and larger streams. Surface irregularities in the small upland areas would also afford cover and some concealment. Sites for construction of bunker-type installations are numerous in stable loess soils in most of the region, and support



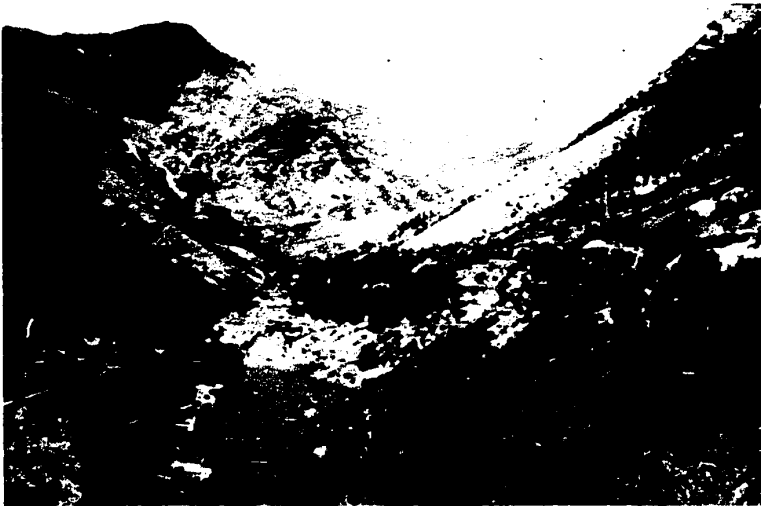
**FIGURE 5.** Plains in the north, such as this cultivated plain northwest of Belgrade near the Danube River, are generally suited for large-scale conventional ground operations (C)

Terrain conditions are generally suited throughout this region for large-scale conventional ground operations. Suitability of the region for such operations is enhanced by the network of principal roads. These roads, mainly bituminous surfaced and two lanes, could sustain military traffic year round. Construction of new roads in most of the region would be relatively easy, involving only minor construction problems, except in small areas of hills and mountains. Offroad dispersal and rapid cross-country movement of vehicles and foot troops would be possible most of the time from about mid-April until late November. Choice of direction, however, would be restricted by large rivers, numerous irrigation and drainage ditches, northwest to southeast orientation of valleys in the west and south, and, northeast of the Danube, by several canals. From late November to mid-April, conditions are favorable about one-third of the time, when the ground is frozen, and marginal the rest of the time, when miry ground would moderately to severely impede movement of tracked vehicles and foot troops

would be required only in small areas of sandy and gravelly soils. Good sites for tunnel-type installations are in exposed bedrock of the small areas of hills and mountains.

Conditions are generally well suited for airborne operations. There are numerous sites suitable for airdrops, helicopter landings, and landing of fixed-wing assault-type aircraft on unprepared terrain. Existing airfields are concentrated mostly around Belgrade and Zagreb. Low-level air approaches to drop zones, landing sites, and existing airfields are generally unrestricted except near hills and mountains. At most sites the construction of airfields would involve little grading and clearing, and runway orientations would be unrestricted. Construction materials, however, are not readily available in most of the area. Weather conditions for airborne operations are most favorable during July and August, when cloud cover is at a minimum.

The Northern Plains are generally unsuited for irregular force operations. The flat to rolling plains



**FIGURE 6.** Shrub vegetation and steep-sided stream valley in southwestern Yugoslavia. This type of terrain is generally unfavorable for large-scale military operations. (C)

would favor rapid cross-country movement of conventional forces, and the extensive network of roads would tend to restrict irregular force operations. Limited cover from flat-trajectory fire is provided by scattered surface irregularities, and cultivated crops provide some concealment from air and ground observation. Village and farm buildings would provide additional cover and concealment. Sustenance would be available on the intensively cultivated plains. Water supplies available from streams, springs, and wells are biologically contaminated. Livestock, fruits, and vegetables from rural settlements would be the best sources of food; clothing, medical supplies, ammunition, and food in small quantities may be available from local storage depots. Numerous sites are suitable for airdrops and for landing helicopters and fixed-wing aircraft.

## **2. Hills and Mountains**

This region occupies 80% of Yugoslavia and consists of rugged highlands having numerous mountain ridges and peaks, narrow, steep-sided valleys (Figure 6), and scattered, nearly level basins (Figure 7). Mountain crests are mostly more than 5,000 feet above sea level, and the highest elevations are in the interior; the maximum elevation, 9,393 feet, is in the northwest. In the mountains, differences in elevation between valley bottoms and adjacent ridges are 2,000 to 7,500 feet, and slopes are mostly between 30% and 45% but exceed 60% in places. In hilly areas, differences in elevation between valley bottoms and adjacent ridges are mostly 700 to 2,000 feet; most



**FIGURE 7.** This cultivated basin near Lake Scutari in southern Yugoslavia is one of the sites suitable for airborne operations in the mountainous areas (C)

slopes are 10% to 30%. Although the highest elevations are in the interior, the roughest surfaces are in large karst areas in the hills and mountains adjacent to the coast. Sinkholes, caverns, and deep ravines are common in these areas. Many of these features intermittently collect water which seeps through their limestone floors into underground streams. In places, the water reappears in springs which feed the few surface streams in these areas. Elsewhere, the hills and mountains are drained by numerous streams which flow mostly through deep, rocky, steep-sided valleys. The hills and mountains are mostly shrub or forest covered (Figure 3), and the larger valleys and basins

are cultivated. Significant culture features in the larger valleys and basins consist of several large towns and a few roads and railroads.

Conditions are generally unsuited for large-scale conventional ground operations throughout the region. Steep slopes, numerous deeply entrenched streams in the interior, and rough surfaces in karst areas, adjacent to the coast in most places, confine vehicular movement to the sparse network of poorly developed roads. These roads, mostly loose surfaced, have numerous sharp curves, steep grades, and narrow bridges and would require almost constant maintenance to sustain military traffic. Construction of new roads, except in larger valleys and basins which are most numerous in the south, would be very difficult and would require extensive cutting, filling, and bridging. Foot troops operating in the region would be provided good cover from flat-trajectory fire and concealment from ground observation by numerous surface irregularities, especially in karst areas. Some concealment from air observation would be provided by forests, which are most common in the interior at moderate to higher elevations of the mountains. The steep-sloped exposed bedrock of the hills and mountains provides numerous sites suitable for the construction of tunnel-type installations, but sites for bunkers are limited mainly to areas of deep, well-drained soils in the basins and valleys.

Conditions are generally unsuited for airborne operations. Although there are a few suitable sites for airdrops and landing of assault-type aircraft in the larger valleys and basins, surrounding high relief restricts low-level approaches (Figure 7). Helicopters would be the best means of facilitating airborne operations. Flying conditions are best in July and August, when cloudiness is at a minimum. The rugged terrain makes most of the region unsuited for the construction of airfields. Larger valleys and basins, especially in the south where most existing airfields are located, contain many sites suitable for airfield construction; however, natural foundations are only fair, and runway orientations would be restricted to the trend of the valleys and basins.

Conditions are generally unsuited for large-scale amphibious operations on the mainland coast and the offshore islands. Although there are numerous beaches, they are short, approaches to them are channelized, and they are backed in many places by rugged terrain. Even where beaches are backed by lowlands, exits are cross-country over unfavorable

terrain features such as stone walls, rugged rocky areas, sinkholes, and steep-banked streams.

The hills and mountains are fair to good for irregular force operations. Conditions for cross-country movement of foot troops would be fair in the hills, but movement would be slowed in rugged mountains and karst areas. Onroad movement would generally be limited to the sparse and poorly developed roads, tracks, and trails. Natural cover from small arms fire and concealment from ground observation would be afforded by numerous steep-sided valleys, gorges, ravines, gullies, and, to some extent in the wide valleys and basins, by built-up areas and scattered farm buildings; conditions for concealment from air observation are unfavorable due to the lack of adequate vegetation. Most of the region is covered by sparse to dense deciduous brush and small trees (Figure 3). At high elevations in the east, stands of mostly deciduous trees offer good concealment from air observation from mid-May to mid-October. Conditions for sustenance are more favorable near cultivated valleys (livestock, poultry, fruits, and vegetables could be obtained from rural settlements) and near population centers (small quantities of food, clothing, medical supplies, and ammunition may be available at local storage depots). Procurement of food and supplies would be difficult in the more rugged sparsely populated regions. Air supply operations by fixed-wing aircraft would be hindered or precluded by rugged relief and unfavorable weather conditions; sites for helicopter landings are generally unrestricted except in forested areas and in the more rugged karst areas. Numerous beaches could be used to supply irregular forces by shallow-draft boats.

### C. Strategic areas (C)

There are two strategic areas in Yugoslavia—Belgrade and Zagreb (Figure 11). These areas are major government, industrial, transportation, and military centers, and their loss would cripple the country's war-making potential.

#### 1. Belgrade

This strategic area (Figure 8), located in the northeastern part of the country, consists of Belgrade and its environs. Belgrade (Figure 9) is the capital and largest city (population estimated at 845,000 in January 1972) and the most important industrial, commercial, transportation, and telecommunication

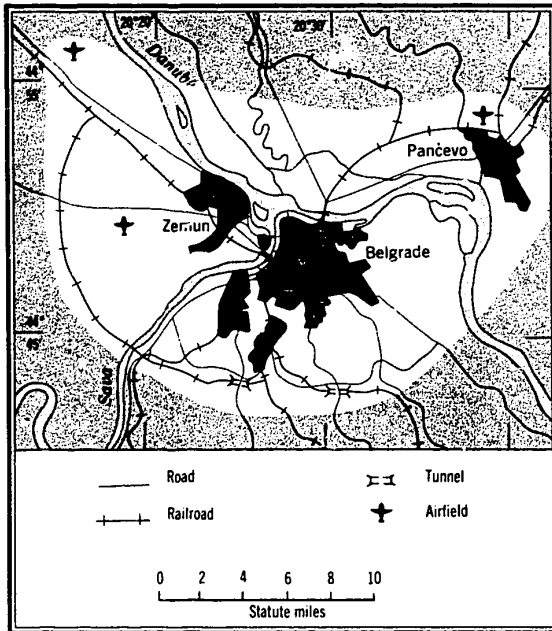


FIGURE 8. Belgrade strategic area (C)

airfield is northwest of the city, and a small civil/military field is at Pancevo. POL (refined petroleum products) storage capacity at Belgrade totals about 330,000 barrels excluding POL stored at airfields; storage capacity at Pancevo refinery is 720,000 barrels. Belgrade is also an important garrison city and has billeting for about 60,000 troops.

## 2. Zagreb

This strategic area (Figure 10), located in the northwestern part of the country, consists of Zagreb and its environs. Zagreb is the second largest city (population estimated at 603,000 in January 1972) and the leading metal processing and machine manufacturing center. The city contains one of the largest electrical equipment plants in the country and is the largest producer of machine tools. Other goods produced within the area include textile machinery, food processing machinery, telecommunication equipment, electric motors, chemicals, drugs, rubber products, and boilers. It is an important road and railroad junction, a major military base, and a telecommunication center. The area has two airfields; the one located southeast of the city is one of the more



FIGURE 9. Downtown Belgrade (C)

center. Industries in the area produce farm machinery, buses, trucks, automobile and tractor engines, engine parts, ball bearings, lathes and other machine tools, telecommunication and electronic equipment, refrigeration equipment, medicines and drugs, cranes, inland waterway craft, and coastal and small oceangoing vessels. At Pancevo, northeast of the city, there is a large petrochemical complex. The city is the largest inland port in Yugoslavia and one of the most important on the Danube. The area is the focal point of transportation in Yugoslavia, and railroads and hard-surfaced roads radiate to all larger urban areas in the country. The main airfield, west of the city, handles international air traffic. A large military

important civil/military airfields in the country and offers regularly scheduled international flights; the airfield located in the southwest is military. Capacity of POL storage facilities within the strategic area totals about 212,000 barrels, not including POL stored at airfields. The area is the site of numerous military installations and contains billeting facilities for about 40,000 troops.

## 3. Other important areas

Four urbanized areas of varying degrees of importance as military, industrial, commercial, and

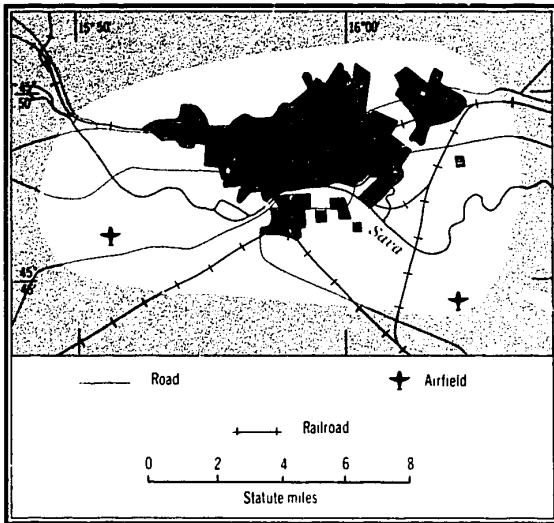


FIGURE 10. Zagreb strategic area (C)

transportation centers are described in the following tabulation:

NAME	IMPORTANCE
Skopje ..... 42°00'N., 21°29'E.	Population 298,000 (January 1972 estimate). Most important highway and railroad junction in southern Yugoslavia. Telecommunication center of southern Yugoslavia. Important products include construction equipment and mining machinery. Iron and steel plant recently constructed is one of largest in country. Important garrison city, billeting facilities for about 15,000 troops. POL storage capacity about 126,500 barrels.
Sarajevo ..... 43°50'N., 18°25'E.	Population 296,000 (January 1972 estimate). Industrial center of central Yugoslavia. Important producer of armament and munitions. Site of largest optical plant in country. Center of transportation network of central Yugoslavia. Important also as garrison city, billeting facilities for 20,000 troops. POL storage capacity about 80,000 barrels.
Ljubljana ..... 46°02'N., 14°30'E.	Population 221,000 (January 1972 estimate). Important industrial and transportation center. Site of largest industrial machinery and equipment plant in country. Telecommunication equipment, chemicals, agricultural equipment, drugs, and precision instruments also produced. Most important highway and railroad junction in northwest-

NAME	IMPORTANCE
Ljubljana (Continued)	ern Yugoslavia. Civil/military airfield one of the largest in country. Billeting facilities for about 10,000 troops. POL storage about 108,000 barrels.
Rijeka ..... 45°21'N., 14°24'E.	Population 148,000 (January 1972 estimate). Most important seaport in Yugoslavia. Industrial activity centered on shipyards, which can build ships up to 75,000 dead-weight tons. Large oil refinery in west-central section of city. Billeting facilities for about 10,000 troops. POL storage about 494,000 barrels.

**D. Internal routes (C)**

The internal routes (Figure 11) afford the easiest avenues of movement between land approaches and strategic areas, between amphibious landing areas and strategic areas, and between strategic areas. All routes contain surfaced roads (Figure 12), and most contain 4'8 1/2"-gauge railroads. Conditions for offroad dispersal and cross-country movement are good from mid-April to early December in large areas of the plains in the north and unsuited throughout the year in the hills and mountains. Soils on the plains are miry from early December to mid-April. Detailed information on the internal routes is presented in Figure 13.

**E. Approaches**

The perimeter of Yugoslavia is about 2,800 miles; about two-thirds consists of land boundaries and one-third is mainland coastline. The offshore islands in the Adriatic Sea have a total coastline of about 1,500 miles. The land boundaries are demarcated and undisputed; all are in mountainous terrain except in parts of the north and northeast. Boundaries with the Communist countries of Hungary, Romania, Bulgaria, and Albania total 1,360 miles; boundaries with Italy, Greece, and Austria total about 500 miles. Detailed information on the perimeter of Yugoslavia is given in Figure 14. (U/OU)

**1. Land (C)**

Conditions for movement across the borders range from good to unsuited. The best conditions for cross-country movement are on the plains which extend into Yugoslavia from Hungary and Romania north of the Danube. Roads crossing the border are most numerous

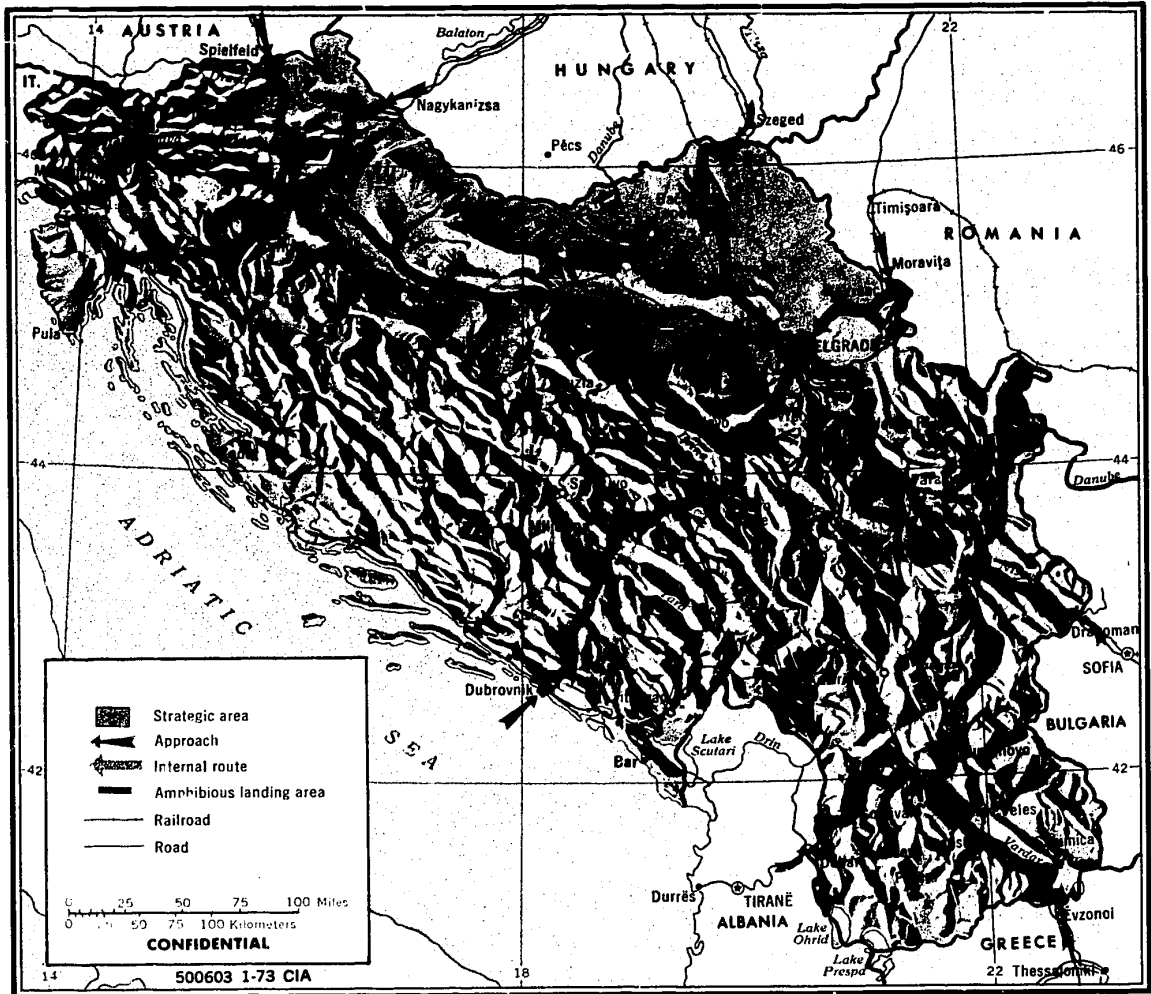


FIGURE 11. Strategic areas, internal routes, and approaches (C)

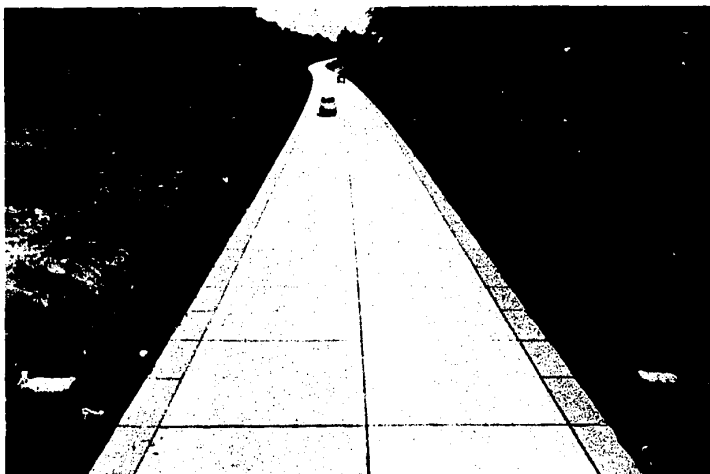


FIGURE 12. Ljubljana-Zagreb highway, part of the internal route between Trieste, Italy, and Zagreb (C)

FIGURE 13. Internal routes (C)

ROUTE AND TERRAIN	ROAD	RAILROAD	OFFROAD DISPERSAL AND VEHICULAR CROSS-COUNTRY MOVEMENT
From border near Trieste, Italy, to Zagreb strategic area. Hills and flat to dissected cultivated plains. Hills covered by shrubs and evergreen or deciduous forest.	Two-lane intermediate bituminous and concrete surfaces, good condition (Figure 12). 1,082-foot bridge over Sava 4 miles west of Zagreb. Two tunnels near Ljubljana and one underpass.	Double track electrified 4'8 1/2'' gage, generally parallel to or within 20 miles of road.	Unsuited in hills. Fair on plains most of year, poor to unsuited during miry season from early December to mid-April.
From border near Spielfeld, Austria, to Zagreb strategic area. Mostly dissected plains; small hilly area near middle of route. Terrain cultivated or covered by shrubs and evergreen or deciduous trees.	Two-lane bituminous surface, good condition from border to Maribor. One tunnel 5 miles southeast of border. Maribor to Zagreb, one-lane, some sections bituminous treated and some gravel surfaces, fair to good condition.	Double track 4'8 1/2'' gage, border to Maribor.	Fair to poor most of year, poor to unsuited during miry season from early December to mid-April and in hills.
From border near Nagykanizsa, Hungary, to Zagreb strategic area. Flat to rolling cultivated plain between border and Varazdin. Dissected plain south of Varazdin covered by shrubs and deciduous forest.	One-lane gravel surface, good condition from Hungarian border to Cakovec. Two-lane intermediate bituminous surface, good condition, Cakovec to Zagreb.	Single track 4'8 1/2'' gage, generally parallel to or within 15 miles of road.	Fair most of year, poor to unsuited during miry season from early December to mid-April on flat plain. Poor most of year and unsuited during miry season in dissected plains.
From border near Szeged, Hungary, to Belgrade strategic area. Flat to rolling cultivated plain.	Two-lane concrete and intermediate bituminous surfaces, good condition. 1,100-foot bridge over Danube River near Novi Sad. Narrow bridge over railroad 5 miles south of Backa Topola.	.....do.....	Fair to good most of year, poor to unsuited during miry season from early December to mid-April.
From border near Moravita, Romania, to Belgrade strategic area. Flat to rolling cultivated plain.	Two-lanes bituminous, good condition, Romanian border to Vrsac. Two lanes bituminous concrete, good condition, Vrsac to Belgrade. 4,500-foot bridge over Danube River at Belgrade.	Single track 4'8 1/2'' gage, parallels road.	Do.
From border near Dragoman, Bulgaria, to Belgrade strategic area. Mainly across cultivated and shrub-covered plains of Nisava and Velika Morava rivers.	Two lanes bituminous, good condition, but winding, sharp curves, and 13 tunnels between Bulgarian border and Nis. Nis to Belgrade two-lane bituminous concrete, good condition, numerous underpasses and sharp curves; 6 miles north of Paracin, 1,083-foot through truss bridge over Velika Morava.	Single track 4'8 1/2'' gage from border to Velika Plana, double track electrified 4'8 1/2'' gage from Velika Plana to Belgrade. Railroad parallels road except from Velika Plana to Belgrade, where it is 15 to 20 miles west of road.	Fair most of year in valleys, unsuited in miry season from early December to mid-April.
From border near Evzonoi, Greece, to route from Bulgaria border at Nis. Mainly across cultivated or shrub-covered valleys of Vardar and Juzna Morava rivers.	Two-lane bituminous concrete surface, good condition. 1,500-foot bridge over Sermenli River 3 miles north of Greece border. Six narrow bridges and two one-way tunnels between Greece border and Gradsko. Four tunnels, narrow bridge, and numerous underpasses between Titov Veles and Nis.	Single track 4'8 1/2'' gage, parallels road.	Fair most of year in valleys, unsuited during miry season from early December to mid-April.



FIGURE 13. Internal routes (C) (Continued)

ROUTE AND TERRAIN	ROAD	RAILROAD	OFFROAD DISPERSAL AND VEHICULAR CROSS-COUNTRY MOVEMENT
From border northeast of Tirane, Albania, to route from Greece border at Skopje. Western half shrub-covered mountains, eastern half flat to rolling cultivated plain and hills east of Tetovo.	One-lane gravel surface, good condition. Albania border to Skopje. Two-lane bituminous concrete surface in good condition, Skopje to Belgrade. Steep grades Debar to Gostivar. Numerous narrow bridges, sharp curves, many underpasses, and a tunnel. Snow blocked during winter months (December through February).	Single track 4'8 1/2'' gage from Gostivar to Skopje, parallels road.	Fair on plains most of year, unsuited in hills and mountains and during miry season from early December to mid-April.
From amphibious landing area near Dubrovnik to Belgrade strategic area. Hills, mountains, and karst areas covered by shrubs, deciduous or evergreen trees in south. Flat to rolling cultivated plain in north.	Two-lane bituminous concrete surface, good condition from coast to Trebinje. One- to two-lane bituminous and gravel surfaces, fair to good condition from Trebinje to Valjevo. Two-lane bituminous surface, good condition from Valjevo to Belgrade. Winding road, steep grades, sharp curves, several tunnels, and numerous narrow bridges. Snow blocked during winter (December through February).	Single track 2'6 1/2'' gage, parallels road from Miljevina to Titovo Uzice, also for short distance northeast of Dubrovnik. Single track 4'8 1/2'' gage parallels road from Valjevo to Belgrade.	Fair most of year on plains, poor during miry season from early December to mid-April. Unsuited in hills, mountains, and karst.
From amphibious landing area near Rijeka to Zagreb strategic area. Hills, mountains, and karst areas covered by shrubs and deciduous or evergreen forest. Flat to rolling cultivated plain near Zagreb.	Two-lane intermediate bituminous surface, good condition. Narrow bridge 0.5 mile north of Karlovac.	Single track electrified 4'8 1/2'' gage, generally parallels road.	Fair most of year on plains, poor to unsuited during miry season from early December to mid-April. Poor to unsuited in hills, mountains, and karst.
Belgrade to Zagreb. Flat to rolling cultivated plains.	Two-lane concrete surface, good condition . .	Double track electrified 4'8 1/2'' gage . .	Fair to good most of year, poor to unsuited during miry season from early December to mid-April.

FIGURE 14. Boundaries (C)

BOUNDARY	LENGTH	STATUS	TERRAIN
	<i>Miles</i>		
Italy.....	135	Demarcated, undisputed. Light fortification..	In north, boundary crosses shrub-covered rugged ranges of Julian Alps; southward, lower elevations in hills and plains.
Austria.....	200	Demarcated, undisputed. Light to medium fortifications, especially near Maribor area.	Mostly mountains covered by shrubs and forest; eastern end, approximately 40 miles, gently undulating cultivated plain.
Hungary.....	390	Demarcated, undisputed. Light fortifications, heaviest concentrations along Drava River.	Low-lying, flat to gently rolling, mostly cultivated plains.
Romania.....	350	Demarcated, undisputed. Scattered light fortifications.	Mostly low-lying, flat to gently rolling cultivated plains; Danube River forms boundary for 145 miles.
Bulgaria.....	335	.....do.....	Mostly scrub-covered, mountainous terrain.
Greece.....	163	.....do.....	Do.
Albania.....	290	.....do.....	Do.
Adriatic Sea coastline.	945	Territorial waters claimed for 10 nautical miles seaward. Coastal defenses best near ports but deployed along entire coast.	Narrow lowland strips scattered along rugged coast; high mountains and bluffs descend abruptly to shore in many places. Offshore islands mountainous and rocky.

on these plains. Elsewhere, cross-country movement would be precluded or severely hindered in most places by mountainous or hilly terrain, and roads crossing the border are generally in valleys. Approaches from all countries except Albania contain surfaced roads and 4'8 1/2"-gauge railroads. The approaches shown on Figure 11 and described in Figure 15 are the best means of land access to Yugoslavia.

## 2. Sea (C)

Sea approaches to Yugoslavia are via the Ionian Sea, the Strait of Otranto, and the Adriatic Sea. The Strait of Otranto, between the southeastern tip of Italy and Albania, is less than 40 nautical miles wide. Offshore approaches to the Yugoslavia mainland, excluding the extremities of Istria and southeast Dalmatia, are restricted to intricate winding channels among numerous islands that form a broad zone of obstructions. Once past this outer zone, most offshore and nearshore approaches to the mainland are clear. The extremities of the coast have relatively few off-lying islands and virtually clear sea approaches. Tidal ranges are small throughout the year; the greatest is a spring range of less than 2 1/2 feet. Tidal currents are weak, although speeds up to 5 knots may occur at some constricted locations. Occasional strong winds from the northeast and southeast are hazardous, especially for small craft. In general, June through August is the most favorable period for amphibious operations.

The coasts of the mainland and numerous off-lying islands are deeply indented by inlets, coves, bights, and bays and are unsuited for large-scale amphibious operations. Consisting of dissected limestone hills and mountains enclosing scattered, isolated lowlands, most of the rugged coasts are fringed by rocky shores; however, numerous, generally short stretches of sand, gravel, and cobble beaches suited for small-scale amphibious operations are within the many coastal indentations. Exits from the beaches are cross-country or by a sparse network of tracks, trails, and roads. Many beaches are backed by small, intensively cultivated lowlands that parallel the coastline or extend short distances inland along streams. Low stone walls and rock outcrops are common in grainfields, orchards, and vineyards. Stone-faced terraces containing vineyards are common along the lower slopes of the adjacent hills and mountains.

The amphibious landing areas shown on Figure 11 provide access to internal routes leading to the Belgrade and Zagreb strategic areas. The amphibious landing area southwest of Rijeka is a 10-mile stretch of coast having many coves and 11 beaches. The longest beach is 400 yards, the next longest is 325 yards, and the remaining beaches are much shorter. Approaches to the beaches are restricted to intricate channels between numerous islands and the mainland. Nearshore bottom slopes are moderate to steep. Beach materials are sand and gravel, and beach widths are 5 to 25 yards at low water and 0 to 23 yards at high water. The tidal range is negligible, and surf 4 feet or higher is rare. All beaches are backed by narrow

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FIGURE 15. Land approaches (C)

APPROACH	ROAD	RAILROAD	OFFROAD DISPERSAL AND CROSS-COUNTRY MOVEMENT
From Monfalcone through Trieste, Italy. Cultivated plains and dissected, shrub-covered hills.	Three-lane bituminous surface, good condition. Narrows to two lanes near border.	Double track electrified 4'8 1/2" gage, parallels road.	Poor to unsuited because of hills, dissected plains, and soft ground.
From Spielfeld, Austria. In cultivated valley of Mur River through hills and low mountains.	Two lanes bituminous or concrete, good condition.	Double track 4'8 1/2" gage, parallels road.	Fair most of year, poor to unsuited during miry season from early December to mid-April.
From Nagykaniza, Hungary. Cultivated flat to rolling plain.	Two-lane bituminous surface, good condition.	Single track 4'8 1/2" gage, parallels road.	Fair to good most of year, poor during miry season from early December to mid-April.
From Szeged, Hungary. Cultivated flat to rolling plain.	.....do.....	.....do.....	Do.
From Moravita, Romania. Cultivated flat to rolling plains.	Two lanes bituminous, good condition.....	.....do.....	Fair most of year, unsuited during miry season, from December to mid-April.
From Dragoman, Bulgaria. Cultivated, dissected plain and shrub-covered, high hills.	Two lanes cobblestone, good condition.....	.....do.....	Fair on plains, unsuited in hills.
From Evzonoi, Greece, through valley of Vardar River; steep bordering shrub-covered hills and mountains.	Two-lane bituminous surface, good condition.	.....do.....	Fair most of year, unsuited during miry season from early December to mid-April.
From Tirane, Albania. Mountains and stream valleys covered by shrubs and deciduous forest.	Two-lane gravel surface, good to fair condition.	No railroad.....	Fair in valleys most of year, unsuited during miry season from early December to mid-April and in mountains.

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cultivated stream valleys flanked by brush-covered hills. A bituminous-surfaced coastal road is within 600 yards of the beaches. A few tracks and trails connect the beaches to the coastal road, which leads to Rijeka.

The amphibious landing area southeast of Dubrovnik consists of nine beaches along a 4-mile stretch of coast on an embayment. The three longest beaches are 300 to 400 yards. Approaches to the beaches are partly obstructed by scattered rocks, rocky shores, several piers, and a few islands. Nearshore bottom slopes are mild to moderate. Beach widths are 5 to 40 yards at low water and 0 to 35 yards at high water. Beach composition is predominantly gravel with some sand. The tidal range is negligible. Surf 4 feet or higher occurs most often (17% of the time) during January through March and least often (7% of the time) during July through September. Behind the beaches are narrow, cultivated stream valleys flanked by hills. Beach exits are cross-country and by a few roads, tracks, and trails leading to a bituminous-surfaced coastal road up to 2,000 yards inland.

### 3. Air (U/OU)

Air approaches<sup>3</sup> are mainly over mountains; the southwestern approach is partly over the Adriatic and Ionian Seas, and the southeastern approach is partly over the Aegean Sea. Approaches from the southwest, over the Italian peninsula, are over mountains that rise to elevations of about 9,600 feet within 130 nautical miles of Yugoslavia; mountains along the Yugoslav coast have peaks exceeding 6,000 feet. Approaches from the northwest are over mountains in Austria, eastern Switzerland, and northern Italy, where elevations reach about 13,000 feet. In Austria, these elevations are within 55 nautical miles of the Yugoslavia border, and in northern Italy and eastern Switzerland they are within 140 nautical miles of the border. From the northeast, approaches are over the plain of Hungary, which is approximately 300 feet above sea level. However, beyond the plain there are hills in northern Hungary and mountains in Czechoslovakia. The mountains have peaks slightly more than 8,000 feet above sea level within 185 nautical miles of the Yugoslavia border. Approaches from the southeast are across rugged terrain, which includes mountains in Romania with elevations of about 8,400 feet about 110 nautical miles from Yugoslavia; mountainous elevations of about 9,600 feet in Bulgaria and Greece within 35 and 55 nautical

<sup>3</sup>The discussion zone for air approaches extends 200 nautical miles beyond the border of Yugoslavia.

miles, respectively, of the Yugoslavia border; and mountains with elevations of nearly 9,000 feet in Albania near the Yugoslavia border.

Climatic conditions in all air approaches to Yugoslavia are most favorable in summer, when cloudiness is least and visibility is generally good, and are least favorable in winter, when cloudiness is at a maximum and visibility is often restricted. The most favorable approaches in any season are over the southeastern Adriatic Sea, the Strait of Otranto, and the Ionian Sea. Weather conditions are more hazardous to aircraft operations in the approaches over mountains. The least favorable approaches are in the quadrant extending from northwest to northeast.

Migratory lows and their associated frontal systems frequently affect all approaches in October through April but are most frequent during the winter months. Widespread multilayered cloudiness, persisting for 1 to 2 days, is normally associated with each frontal system and causes ceilings which are very low over the mountains and somewhat higher over the water areas. Mean cloudiness in winter ranges from 55% to 85% in all approaches. Frontal systems are rare in summer and cloudiness is usually scattered cumulus having occasional strong vertical development. Thunderstorm activity is sometimes associated with cold fronts moving through the southern approaches in October through April. Thunderstorms over most land areas are rare in winter, and the frequency gradually increases to a maximum of five to 12 per month in May through August. These storms occur most frequently over the mountains. Severe turbulence and hail may occur in or near thunderstorms; severe turbulence may also occur in approaches over mountains during winter. The mean freezing level is highest in the south and lowest in the north. It varies from the surface to about 5,000 feet in winter and from about 8,000 to 15,000 feet in summer. Severe aircraft icing occurs in summer only in thunderstorms and towering cumulus clouds above the freezing level. In winter, however, conditions conducive to severe icing may exist over large sections for several days, especially in the dense clouds associated with frontal systems.

Winds aloft are variable at lower levels and are predominantly westerly above 10,000 feet. Mean wind speeds are relatively low but increase to a maximum of 30 to 45 knots at 30,000 to 45,000 feet in the southern approaches in winter, and occasionally westerly winds greater than 50 to 60 knots may occur at this level in any season.

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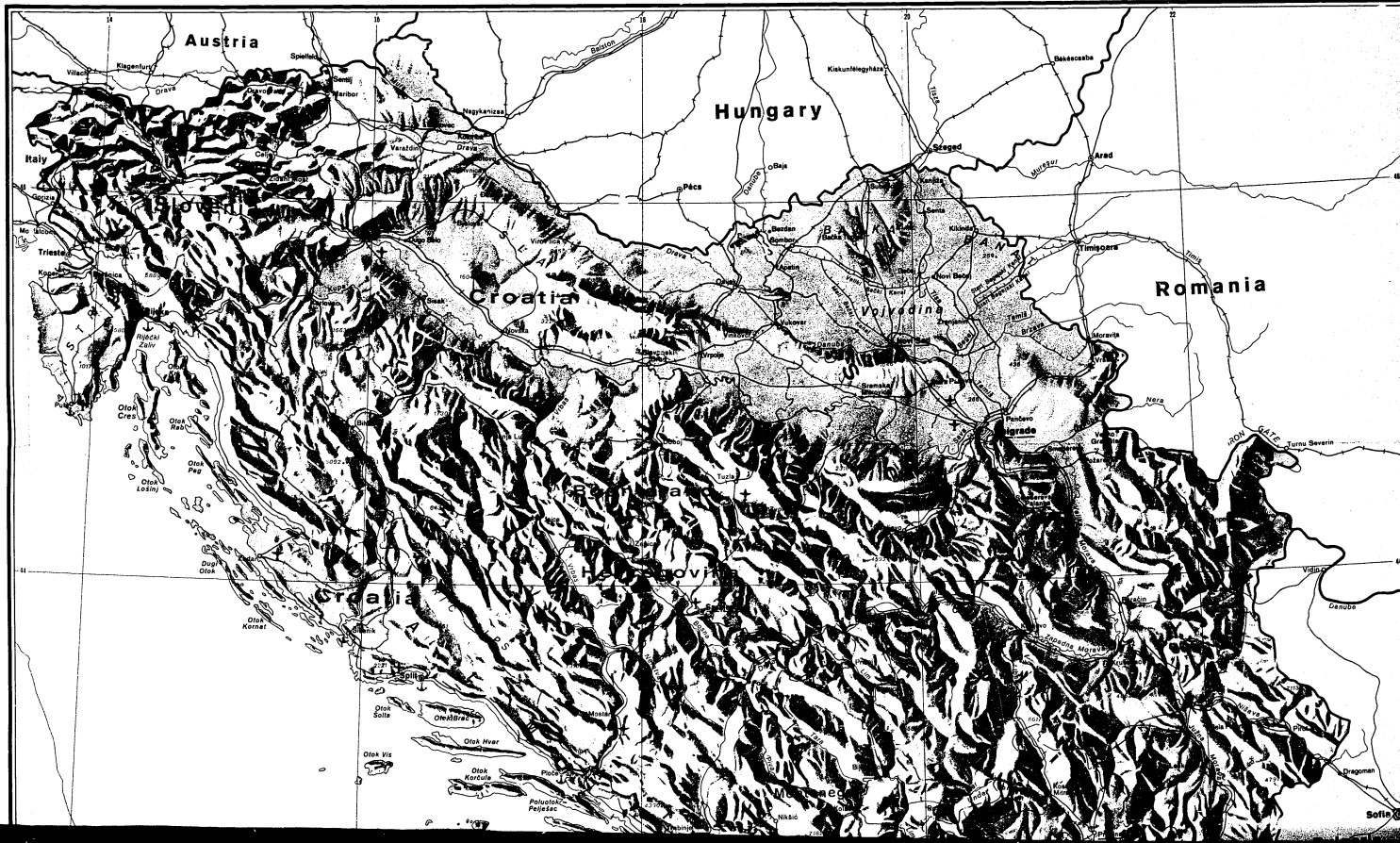
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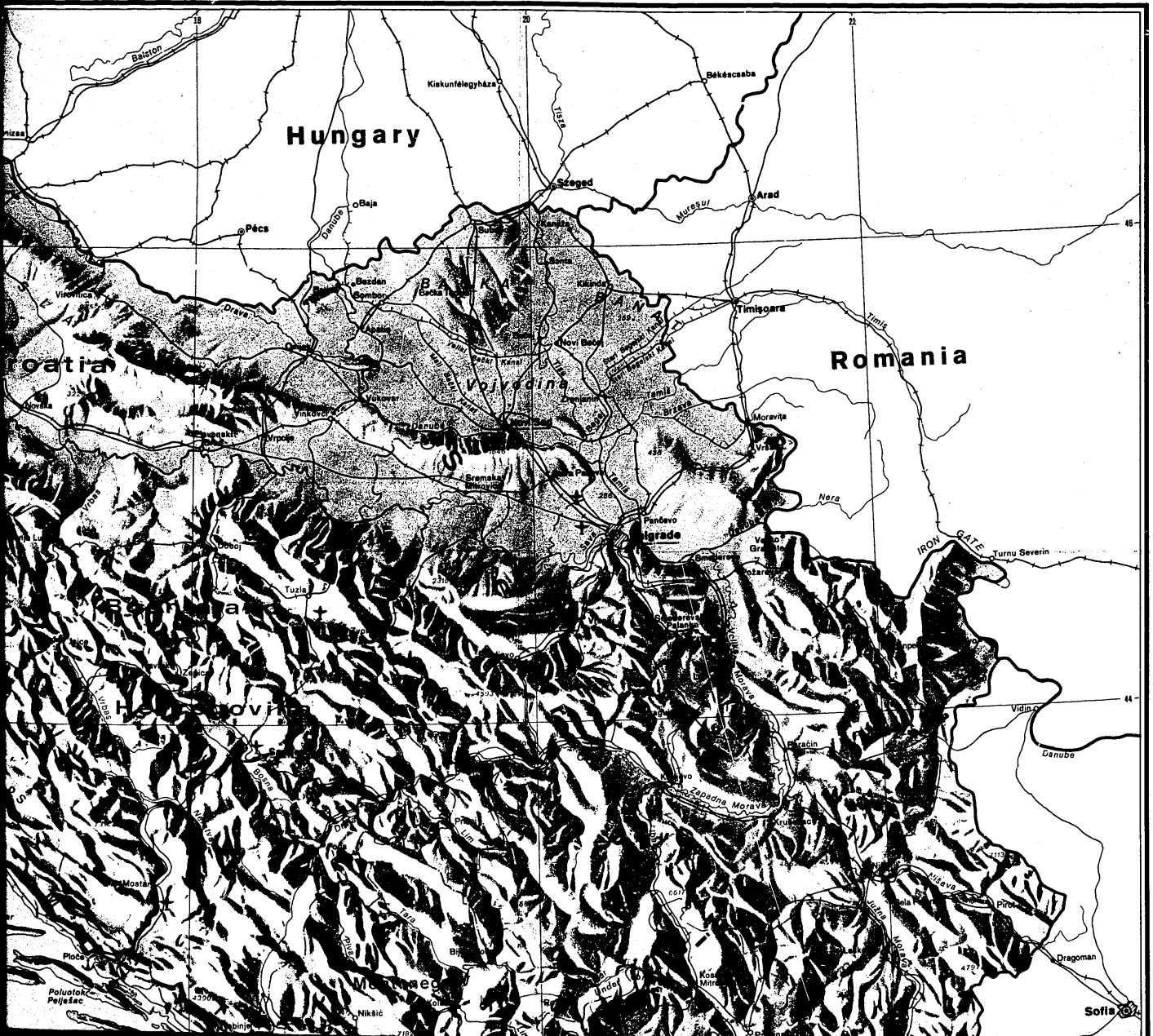


Places and features referred to in this General Survey (U/OU)

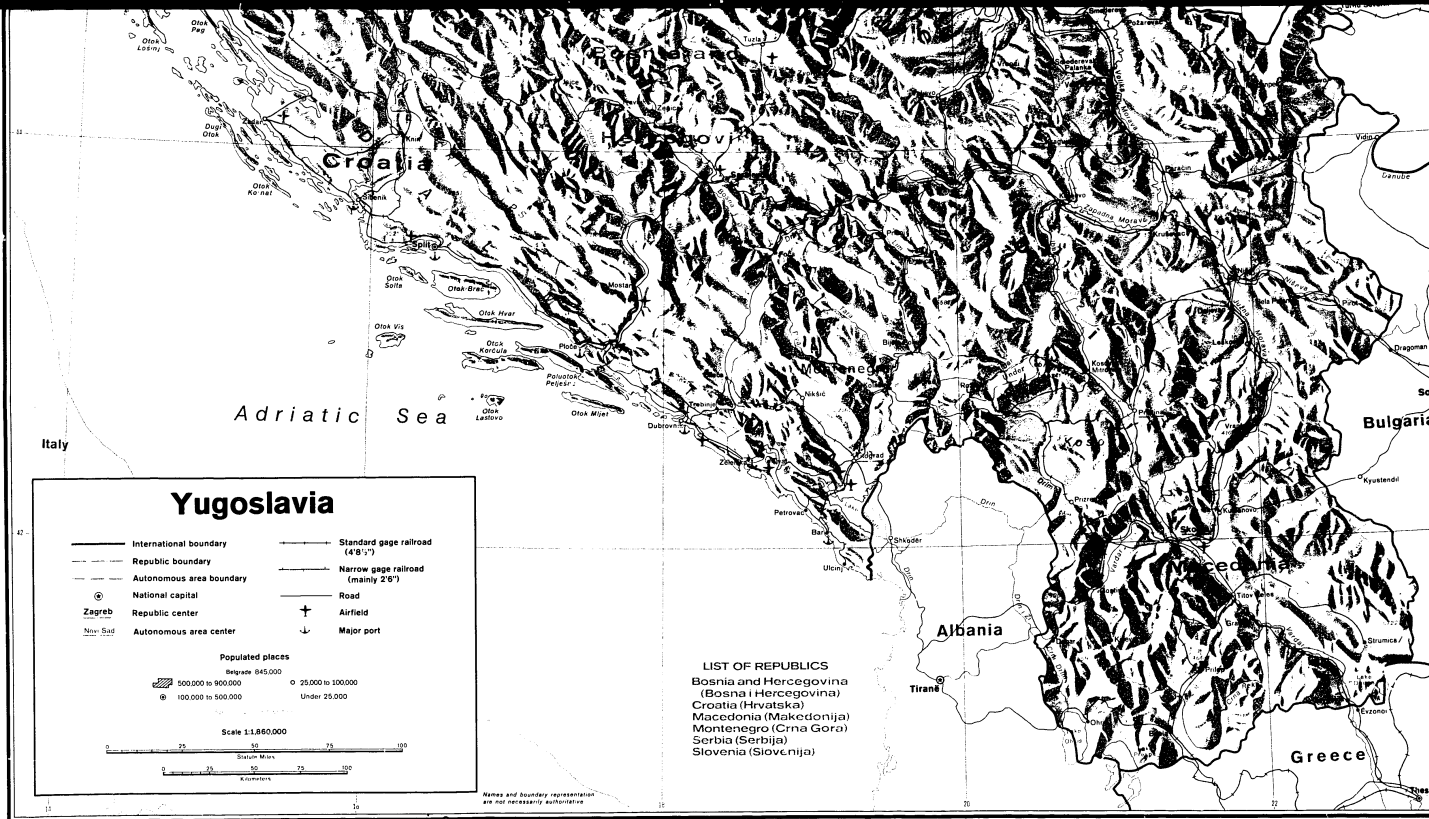
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	°	'N.	° 'E.		°	'N.	° 'E.		°	'N.	° 'E.			
(sea).....	43	00	16	00	Kikinda.....	45	50	20	29	Sljeme (mt).....	45	54	15	57
.....	44	42	20	31	Kladovo.....	44	37	22	37	Smederevo.....	44	39	20	56
Egypt.....	39	00	25	00	Kloštar Ivanić.....	45	44	16	25	Sofia, Bulgaria.....	42	41	23	19
.....	31	12	29	54	Knin.....	44	02	16	12	Sombor.....	45	46	19	07
.....	45	49	19	39	Kolašin.....	42	49	19	32	Spielfeld, Austria.....	46	42	15	38
.....	44	51	21	20	Koper.....	45	33	13	44	Split.....	43	31	16	26
.....	45	18	14	32	Koprivnica.....	46	10	16	50	Srbobran.....	45	33	19	48
.....	45	30	21	00	Korčula.....	42	58	17	08	Stara Pazova.....	44	59	20	10
.....	45	26	16	54	Kosovska Mitrovica.....	42	53	20	52	Stara Planina.....	43	15	25	00
.....	42	05	19	06	Kotor.....	42	25	18	46	Stružec.....	45	32	16	33
.....	44	54	20	17	Kozara (mts).....	45	00	16	55	Subotica.....	46	06	19	40
.....	45	30	20	36	Kozare.....	42	56	22	06	Sumadija (region).....	44	20	20	40
.....	45	27	20	27	Kragujevac.....	44	01	20	55	Svetozarevo.....	43	59	21	15
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.....	44	50	20	30	Kraljevo.....	43	31	21	42	Tekija.....	44	41	22	25
.....	45	35	18	11	Kralovo.....	42	05	22	12	Tetovo.....	42	01	20	59
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.....	44	49	15	52	Kupari.....	42	37	18	12	Timișoara, Romania.....	45	45	21	13
.....	45	54	16	51	Kutina.....	45	29	16	47	Tisa (strm).....	45	15	20	17
.....	42	25	18	40	Lapovo.....	44	11	21	06	Tiranë, Albania.....	41	20	19	50
.....	44	06	22	06	Latakia, Syria.....	35	31	35	47	Titograd.....	42	26	19	16
.....	45	08	18	01	Lendava.....	46	34	16	27	Titov Veles.....	41	42	21	48
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.....	46	13	16	55	Ljubljana.....	46	03	14	31	Tivat.....	42	26	18	42
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.....	44	26	26	06	Maribor.....	46	33	15	39	Trieste, Italy.....	45	40	13	46
.....	47	30	19	05	Mežica.....	46	31	14	52	Turjak (mt).....	42	51	20	02
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.....	46	23	16	26	Mokrin.....	45	56	20	25	Tuzla.....	44	33	18	41
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.....	45	24	14	48	Nova Gorica.....	45	57	13	39	Velika Plana.....	44	20	21	05
.....	43	32	16	18	Novi Sad.....	45	15	19	50	Velika Tila (hill).....	44	59	21	00
.....	44	44	18	05	Novo Miloševo.....	45	43	20	18	Veliki Bački Kanal (canal).....	45	52	18	52
.....	42	56	22	56	Novska.....	45	20	16	59	Veliki Jastrebac (mts).....	43	24	21	26
.....	45	33	18	55	Obrva.....	43	48	20	36	Venice, Italy.....	45	27	12	21
.....	44	53	19	21	Ohrid, Lake (lake).....	41	00	20	45	Videm-Krško.....	45	58	15	29
.....	42	39	18	07	Okučani.....	45	16	17	12	Vinca.....	44	46	20	36
.....	45	48	16	15	Opatovac.....	45	16	19	10	Vinkovci.....	45	17	18	49
.....	46	02	17	04	Osijek.....	45	33	18	42	Vrhovec.....	45	53	16	25
.....	45	26	20	18	Otranto, Strait of (strait).....	40	00	19	00	Vrbovsko.....	45	22	15	05
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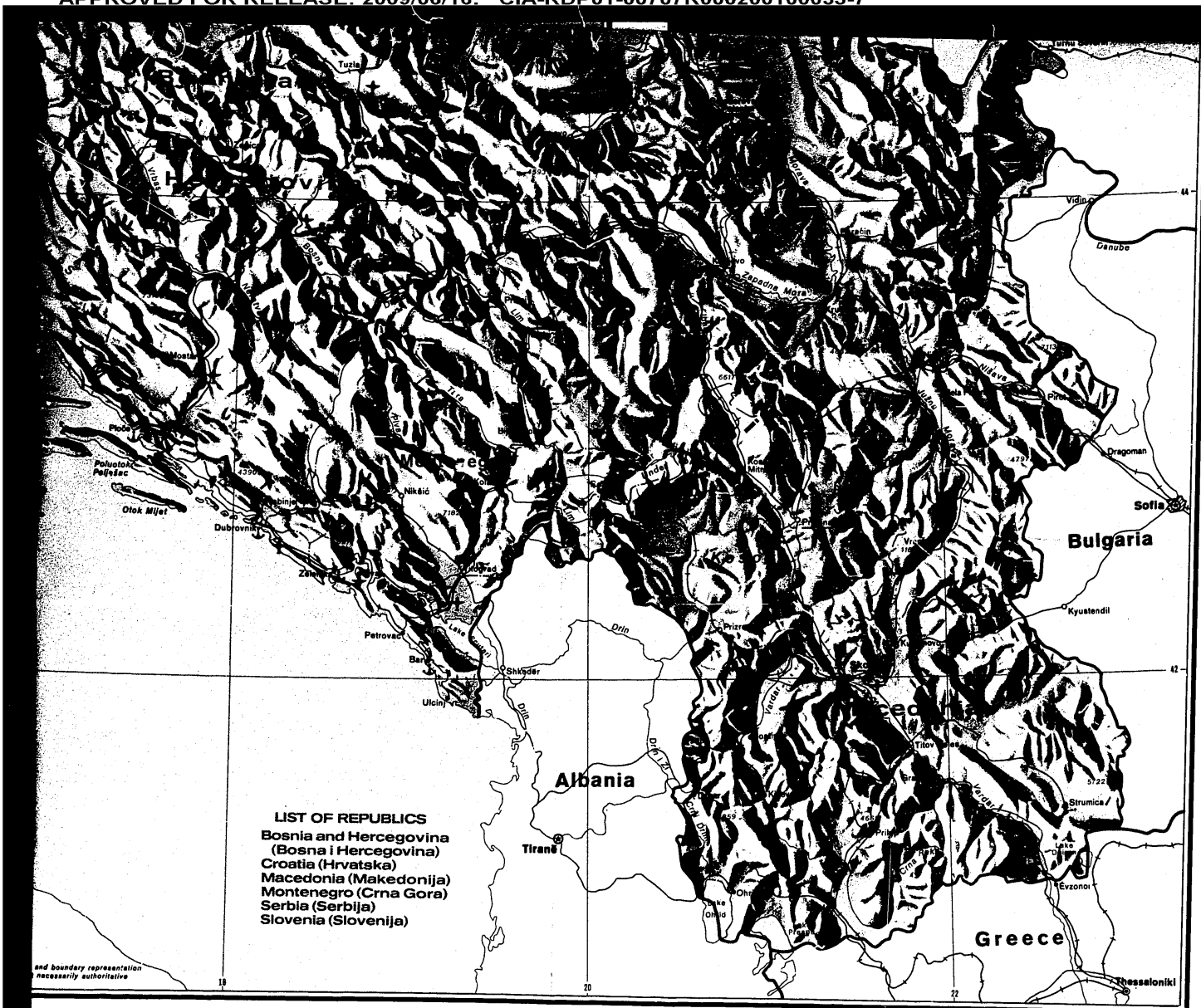






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Terrain and Transportation Fig



Terrain and Transportation Figure 16