The Caspian Sea Encyclopedia
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Introduction


Today the Caspian Sea is known to readers thanks to its oil and gas resources, sturgeon and caviar, significant sea-level variations, socio-economic and political problems.

The Caucasus and Central Asia (http://eurodialogue.org/files/fckeditor_files/Caspian-sea-map2.png)
For more than 250 years the Caspian Sea was shared by two states: Russia (the Soviet Union) and Persia (Iran). After the disintegration of the USSR in 1992, the new independent states of Azerbaijan, Turkmenistan and Kazakhstan have radically changed the political and economic situation in the region. In addition to Russia and Iran, who had determined the situation on the Caspian for a long period, Azerbaijan, Turkmenistan and Kazakhstan are now interested parties, beginning a new stage in the historical development of the Caspian region. This increase in the number of the Caspian legal entities from two to five has given rise to a whole tangle of geopolitical, economic, international legal, ethnic and environmental problems, each of which demands its own approach and settlement mechanism.

Of the Caspian states, Russia is the largest, followed by Kazakhstan (the world’s 9th largest country by territory), and the Islamic Republic of Iran (17th in the world). The Azerbaijan Republic is a Transcaucasian state, while Turkmenistan and Kazakhstan are Central Asian states. All of the states have a presidential republic form of government. The territory of the regional states is 21,996,600 km². Development of economic and political relationships among all the countries of the region is very important, which is why after the breakup of the Soviet Union they had to build a new system of relationships governing movement and employment among them. Four of the countries are members of the Commonwealth of Independent States (CIS), which influences their interaction and cooperation in relation to many issues. These are countries differing in levels of economic development, types of established political regime, the nature of their foreign relations, religious aspects (Christians, Moslem, Buddhists), and the cultural and psychological mentality of their peoples. Five countries of the Caspian region have 4% of the world territory and 4% of the world population. Nearly 3% of the world’s gross national product (GNP) is concentrated here. The Caspian Sea region plays a significant role in the world economic system; the world’s economics, in general, depends to a great extent on the economic situation and development in this region, and on the active involvement of the region in the world’s economic relations.

The significance of the Caspian region is related, to a great extent, to its multiple mineral resources, the reserves of which differ greatly. Most essential are the hydrocarbon resources, represented by major fields with commercial reserves ensuring their profitable extraction. Other mineral deposits are of local significance only and are used mostly for meeting local needs in fuel, building materials, etc. Prospective oil- and gas-bearing provinces here were determined in the early 1960s. But consideration of the global significance of these resources can be controversial. It was noted that hydrocarbon resources of the Caspian are great, but the Caspian is not the Persian Gulf and it cannot claim the role of a complete alternative source for the world oil market. The US Department of Energy reports that the total resources of the Caspian region are estimated at 100–200 billion barrels of oil (which exceeds North American oil resources as a whole) and 7.9 trillion cubic meter of gas. This makes the region the world’s third largest for natural gas reserves. The report, prepared by the Organization on Economic Cooperation and Development (OECD), says that the proven oil resources of the Caspian constitute approximately 3% of the world reserves.
The other, and historically most essential, natural resource of the Caspian is its biological resource. The most important of the Caspian’s biological resources is its fish stocks: about 123 fish species and subspecies. Their composition has been shaped by the course of the historical evolution of the sea: isolated from other seas and the Atlantic Ocean, it contains species originating both in the north (the Arctic Ocean) and south (the Mediterranean Sea). The Caspian is biologically unique, because together with the rivers that flow into it – first and foremost the Volga – it contains the world genofund of the sturgeon and is the world’s only repository of a diversity of species of sturgeon.

One of the most catastrophic aftereffects of the anthropogenic intervention into the Caspian ecosystem is related to the population of sturgeons, which are the most valuable commercial fishes of the Caspian Sea. In the past century, their catches were maximum in the middle 1970s (26,000–27,000 t); this occurred after the legal prohibition of their marine fishery issued in 1960. Catches of sturgeon in the Caspian Sea accounted for up to 90% of the total world catches. However, later, sturgeon abundance catastrophically dropped. First, from the end of the 1980s, a disease (miopathy) developed, which involved the greater part of the sturgeon population. The origin of this disease is still unclear. In addition, after the disintegration of the USSR and the formation of new independent states, a non-controlled fishery has started in the sea. As a result, the commercial resources have multifold decreased as compared to the 1970s.

Sturgeon are valuable for, among other things, their caviar, an expensive delicacy in high demand on the world market. However, diminishing catches in the Caspian have led to a drop in caviar production. In 1989 the Soviet Union produced 1,365.6 t of black caviar and Iran 282 t. By the late 1990s Russia produced only 40 t/year, other new sovereign Caspian states (excluding Turkmenistan) 34.8 t, and Iran about 150 t. Already, even before full-scale production of hydrocarbons in the Caspian Basin has begun, the situation of the sturgeon in the Caspian Sea is catastrophic, so much so that some experts speak in terms of the Caspian losing its fishery significance.

In addition to sturgeons, two sprat species were of significant commercial importance; however, after the mnemiopsis invasion, their catches have sharply dropped. One of the principal problems of the Caspian ecology consists of the necessity of elaboration of efficient measures for protection of the marine environment from negative anthropogenic impacts, first of all, the rehabilitation of the unique sturgeon community.

The threats of the deterioration of the environmental situation in the Caspian region and of the depletion of its natural resources directly depend on the condition of the economy and awareness of the society about the global character and importance of these issues. This threat is especially great because of the excessive development of the fuel-power industries, drawbacks of legal foundations of the nature conservation activities, restricted application of the nature-saving technologies, and low ecological culture, which increases the risk of technogenous catastrophes.
The unsettled delineation of the Caspian Sea and the uncertainty in its legal status are the main obstacles for successfully coping with many issues, including environmental protection and preservation of the biological resources. Here, the key issue should be the provision of national and international environmental safety. This means elaboration of a system of coordinated state and interstate mechanisms, actions, and guarantees based on the compliance, by one and all states, with the common humanitarian principles and norms of the international legislations that are called to guarantee effective solutions or to prevent emergence of environmental problems of interstate and world community dimensions. Rapid settlement of the legal status of the Caspian is necessary for a transition to sustainable development capable of ensuring a balanced solution of the socioeconomic and nature-conservation issues in the interests of the Caspian countries and the whole world community.

As most of the publications on the Caspian Sea was published in Russian with a limited access to foreign readers (see References), we hope that “The Encyclopedia of the Caspian Sea” will help to understand specific Russian, Kazakh, Azerbaijani, Turkmen, and Iranian terms, terminology, and names of geographical features much better.

The encyclopedia includes a chronology of historical events having relation to the Caspian Sea development and study for recent 300 years – from the time of Peter I to the present.

This publication is intended for wide public – from decision-makers to school pupils, for all those who are interested in the problems of this region, its geography, history, ethnography, economics and ecology. This book is intended for specialists working in various fields of physical oceanography, marine chemistry, pollution studies, and biology. It may also be useful to undergraduate and graduate students of oceanography. The authors hope that this monograph will complement knowledge of the nature of the Caspian Sea, especially the present-day state of this extremely interesting basin. More information on particular issues may be obtained from the reference list.

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Moscow, Russia
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Abakku, Abakko Sea – a name of the Caspian Sea used by renowned Venetian traveler Marco Polo.

Abaskun, Abeskun, Abestun – an ancient port not far from the mouth of the Gorgana River. A. played an important role in East-European communications. The history of Abaksun's appearance is unclear. The port was obviously known to Ptolemaeus (Second century) under the name of Socanaa. In Arabian-Persian written records, A. is mentioned as having been founded by Shakh Kavad (late fifth or early sixth centuries) and was a “trading place for all engaged in trade voyages over the Khazar Sea”. The port was connected with the most important overland roads Via Gorgan. The ancient information about marches of the Russians to the Caspian Sea are found in the history of Tabaristan, written from 1216 to 1217 by Mukhammad, a son of Al-Khassan. He knew about attacks of the Russians on A. during the reign of Khassan, a son of Zeida (864–884). Persian historian Ibn-Isfendiar wrote that the Russians sailed over the Caspian and called on port A. in 909–910. A. was flooded in 1304, as was mentioned by the Persian writer Nadjati, as a result of the Caspian Sea level rise in the vicinity of present-day Gyumush-tepe (“Silver hill”).

Abaskun (Abeskun) Sea – medieval Oriental records often refer to Astrabadsky Bay in the Caspian Sea (Iran) and the Caspian Sea proper in this way. Perhaps for some time this name was official. For instance, Farukhi, a Persian poet at court of Sultan Makhmud Gaznevid, in his ode to the Sultan, wrote: “Your estates – from the banks of the Gang to the Abaskun Sea.” The well-known author of the “Gaznevidian” memoirs Abu-el-Fazl Beikhaki and the great Abu Reikhan Biruni called Astrabadsky Bay the A.S. or “the sea of the Gorgana Bay.”

Abich William German, German Vilgelmovich (1806–1886) – geologist who, during his lifetime, was given the title, “a father of the Caucasus and Caspian Sea geology.” He was born in Berlin, a German by origin. In 1844, A. begins a study of oilfields in the Apsheron Peninsula and is the first to find some regularities
in their formation. He discovered certain genetic relationships between commercial oil reserves and anticlinal structures of the Earth’s crust and laid the scientific foundations of geothermal investigations of oilfields. He also developed a theory of secondariness (i.e. of oil migration). Furthermore, A. revealed a genetic relationship between mud volcanism with oil- and gas-bearing capacity in the interior, and he was the first to voice his opinion on the role of tectonic faults in the formation and destruction of oil and gas deposits. He also made the first attempts at chemically classifying effusive rocks and studied saline lakes and mineral sources in the Caucasus. In 1859–1861, A. made two visits to the Caspian Sea area, first to the Baku and then to the Apsheron archipelago. Here he gave a description of Neftyanye Kamni, prepared the first layout of underwater stones in this region, and proposed their links with an underwater ridge connecting the Apsheron Peninsula with the Cheleken Island. In the Baku archipelago, he gave a detailed morphological description of the islands Kurinsky Kamen, Pogorelaya Plita, Bulla, Svinoy and others. A. developed a hypothesis on a mud-volcanic origin of all islands in the Baku archipelago and studied mud volcanoes located in the Circum-Kura lowland. With A., there are connected works on studies of a geological profile of the Apsheron oil- and gas-bearing province. In 1863, he prepared the first geological map of the peninsula at a scale of 1:42,000. In 1878–1887, A. published “Geological Studies of the Caucasian Countries” (vols. 1–3). In 1853, he was elected the Academician, and in 1866, an Honorary Member of the Petersburg Academy of Sciences.

Abrasion (L. *abrasio* – scrubbing off) – wearing of banks and coastal parts of the bottom of large water bodies (seas, lakes, reservoirs) by waves and tides. The intensity depends on the wave effect and also on the hardness of rocks, a condition of formations. A. is also observed on coasts of water bodies affected by waves stirred by passing ships. A. may be intensified as a result of reduced solid flow of waterstreams.

**Abrasion Terrace** – a coastal part of the former surface of the sea bottom shaped by abrasion. A cross-section of A.T. represents a specific convex curve with mild slopes near the coast and great slopes near the foot of the A.T. An ancient A.T. may be dipped (submerged) or uplifted (emerging). Several uplifted terraces form a coastal abrasion terraced plain. The coast of the piedmont Daghestan on the Caspian Sea presents a narrow terraced abrasion-accumulative low-lying coastal plain.

**Abu Khamid Al-Garnati** (1080 or 1100–1169 or 1170) – an Arabian explorer, his full name was Abu Khamid Mukhammad Ibn Abd ar-Rakhim al-Garnati al-Andalusi. In 1117 or 1118, he left Andalusia and arrived, first, to Alexandria, then to Cairo where he attended lectures of theologians and grammarians and also visited ancient Egyptian sites. He also went to Baghdad and Persia. In 1131, he crossed the Mughan Steppe and Apsheron Peninsula and arrived at Bab-al-Abwab (Derbent). For 2 decades, he lived in the merchant city of Saksin (perhaps a new name of the old Khazar capital, Itil) on the Volga banks, from where he traveled to many other places. From Daghestan over the Khazar (Caspian) Sea, he made his way to the country of Khazars and “reached a big river that was many times bigger than the Tigris; it resembled a sea from which big rivers were flowing out.” This was the Itil (Volga). He states that the Volga begins upstream in Bulgar and flows into the sea, forming 70 arms. In 1135, A.Kh. journeyed up the Volga as far as Bulgar City. In 1150–1159, he traveled through the Russian lands. He went to Kiev, and for 3 years he lived in Hungary. After making a pilgrimage to Mecca, he returned to Baghdad. He wrote the treatises “Clear Description of Some Miracles of Maghreb” and “Present to Minds and Excerpts from Miracles.”

**Academic Expeditions of 1768–1774** – five expeditions organized by the Saint-Petersburg Academy of Sciences having a common purpose and plan and a single comprehensive instruction. In official documents of the eighteenth century, they were called “physical expeditions of the Academy of Sciences.” These were independent expeditions and the largest in the history of the Russian geography in the second half of the eighteenth century, and were multi-purpose trips for study of the nature and population of Russia with its specific economy, everyday life, and culture. Out of these five expeditions, two expeditions headed by German natural scientist Samuel Gotlib Gmelin and Riga citizen Iogann Anton Gildenshtedt went to the Astrakhan gubernia (district). Studies were conducted in the Circum-Caspian area, including some Iranian regions. I. Gildenshtedt described the Kuma River and the Western Manych. He was, in fact, the first researcher of the Kuma-Manych depression. S. Gmelin investigated Black Earth and the banks of the Volga River, and studied specific features of the Caspian Sea level fluctuations. He noted that
“the rise and recess of the Caspian Sea level depends on weather and winds, and rivers flowing into the sea equally contribute to these fluctuations.”

Although one more expedition led by Pyotr Simon Pallas was sent to the Orenburg gubernia, on the way back they passed through Astrakhan, Sarpin Lowland, and Yergeni. It was P. Pallas who came to a conclusion that Yergeni was “the ancient bank of the Caspian Sea.” He also found for the first time that the level of the Caspian Sea was lower than the level of the Black Sea by approximately 20 m (by modern data, the difference between the levels of these seas reaches 27 m). At that time, Pallas also made an assumption that some time ago the northern Circum-Caspian steppes were covered with Caspian waters, linked via a strait along the Manych with the Black Sea. Pallas thought that the Caspian Sea level dropped due to the formation of the Bosporus Strait. This hypothesis, with some reservations, was confirmed by later investigations.

Academicians S. Gmelin and P. Pallas were also the first researchers of the fauna of the Caspian.

Ada Kosa – located in the south of the Mangyshlak Peninsula opposite the Tokmak cape on the Kazakh coast of the Caspian Sea. Closes the Kenderli Bay.

Adji-Darya (Kazakh – “bitter sea”) – Kazakh name for Kara-Bogaz-Gol.

Adji Lake – located in the Kayakentsky Region of the Daghestan Republic 14 km from the Caspian Sea and 3 km from a railway. Its maximum depth is 1.0–1.5 m, and its area is 5.2 km². Heavy salinity limits vegetation development. In summer, it dries out nearly completely and becomes a solonchak. It is a remnant of a lagoon separated from the Caspian Sea resulting from sea level drop.

Adjibai Spawning Grounds – the only complex of artificial spawning areas of the Atrek populations of sea roach and common carp on the Caspian Sea coast. Located in the Atrek River zone in Turkmenistan.

Ag-Deniz – Tatar name of the Caspian Sea (translated as “White Sea”) in the eighteenth to nineteenth centuries.

Agrakhan Bay – located between the mainland bank, the western bank of the Agrakhan Peninsula, and Chechen Island on the western coast of the Caspian Sea, Republic of Dagestan. It is 37 km long and from 3 to 11 km wide. The area of A.B. is 365 km². The bay is shallow: the greatest depth is 3–3.6 m only at the entrance into it. The southern part of A.B. stays dry for long periods, being inundated only at storm surge. The unique feature of A.B. is tendency for sharp level drops when southwestern surge winds blow. Prevailing currents are up to 15 cm/s. Northern winds push ice into A.B. The Bay receives waters of the Terek River, the delta of which covers nearly its whole western bank.

Agrakhan Cossack Host – established in 1722 by Tersky Cossacks after moving over the boundary of the Sulak River. It settled near the Sacred Cross fortress where a canal branched off from the Sulak R. going to the Agrakhan Bay and
into the Caspian Sea. Cossacks guarded the coastal area and communication routes on the sea. In 1724, one thousand Don Cossacks came to live here. After signing the Gyandj Treaty in 1735 with Persia, the border was moved to the Terek R. (the fortress of the Sacred Cross was abandoned) and A.C.H. was moved to a new fortress, Kizlyar. Here, the former Tersky Cossacks formed the Tersky-Kizlyar Cossack Host, while the former Don Cossacks formed the Tersky-Semeinoye Cossack Host. Both hosts survived until 1832 when they were united with the Grebensky Cossacks, forming the Caucasian Linear Cossack Army.

**Agrakhan Herring** (*Alosa Brashnikovi agrachanica*) – a large herring that spends winter in the Southern Caspian and migrates to spawn in the western part of the Northern Caspian. Spawning is in May–June in the southwestern part of the Northern Caspian at a depth of 2–4 (6) m at a water temperature of 20–22°C and salinity level from 1 to 5‰.

**Agrakhan Peninsula** – a low (up to 20 m) sandy peninsula on the western coast of the Caspian Sea in the Republic of Daghestan, Russia. Its length is approximately 50 km and it has a width up to 6 km. The area of the A.P. is 212 km², it confines from the east the Agrakhan Bay into which the Terek River flows. The western bank of the Agrakhan Bay was first formed as a coastal or island embankment that later turned into the Agrakhan Bar. The vegetation is semi-desert, consisting of wormwood, spurge, and sea reeds that grow on solonchaks. Dune tops are covered with tamarisk.

**Agrakhan Shad** (*Alosa sphaerocephald*) – endemic shad. Its length is no more than 25 cm, and it averages 16–18 cm. It spends winter in the Southern Caspian and for spawning it runs to the Northern Caspian. It lays eggs at a depth of 1–6 m at a water temperature of 18–20°C and a salinity of 8–9‰.

**Agreement Between the Republic of Kazakhstan and the Azerbaijan Republic on the Delineation of the Caspian Seabed Between the Republic of Kazakhstan and Azerbaijan Republic** – signed by the presidents of the Republic of Kazakhstan N. Nazarbaev and of the Azerbaijan Republic G. Aliev in Moscow on November 18, 2001. The parties agreed that “the Caspian Seabed and its subsoil shall be delineated between the Parties along the median line plotted equidistant from the initial baseline points on the shoreline and the islands. The coordinates of the initial baseline points shall be determined proceeding from the mean long-term Caspian Sea level equal to the mark minus 28 m of the Baltic Height System.” Geographical description of the medial line and its coordinates shall be determined on the strength of the agreement of the parties mapping materials and initial baseline points and shall be recorded in a separate Protocol that will be a supplement to this Agreement and will be its integral part. The Parties shall, within their seabed sectors, exercise their sovereign rights for the purposes of Caspian seabed and subsoil resources exploration and management, laying subsea cables and pipelines over the Caspian seabed, construction of man–made islands, berms, dams, ramps, platforms, and other engineering structures as well as conducting other legally valid economic activity on
Agreement Between the Russian Federation and the Azerbaijan Republic on the Delineation of Contiguous Areas of the Caspian Seabed – signed by the RF President V. Putin and Azerbaijan Republic President G. Aliev on September 23, 2002 in Moscow. The Agreement was a logical sequel to the Joint Agreement of the Russian Federation and the Azerbaijan Republic on the principles of cooperation in the Caspian Sea signed by the presidents on January 9, 2001. The Agreement stipulates that the Caspian seabed and its subsoil are delineated between the parties on the basis of the method of median line drawn through equidistant points and modified by arrangement between the Parties as well as on the basis of the generally-recognized principles of international law and the existing practice on the Caspian. Established are geographical coordinates of the delineation line passing through the contiguous areas of the Caspian Sea between the RF and Azerbaijan Republic to exercise sovereign rights in respect of mineral resources and other legally valid economic activity associated with the use of subsoil on the seabed. The initial point of the aforesaid line of delineation of the contiguous areas of the Caspian seabed is the point situated at the site where the RF and Azerbaijan state frontiers come to the Caspian Sea water’s edge at the coordinates 41°50’5 N and 48°35’6 E that are determined by the topographic map scale 1:200,000 (sheet K–39–XIX) of 1979 issue. The terminal point of the line of delineation is the point with coordinates 42°33’6 N and 49°53’3 E. The said point may be taken as the point of junction of the lines of Caspian seabed delineation between the RF, the Azerbaijan Republic, and the Republic of Kazakhstan, which will be recorded in trilateral agreement between them. The delineation line is plotted on the scheme of delineation of contiguous areas of the Caspian seabed agreed between the parties. The Parties shall exercise their sovereign rights in respect of mineral resources and other legally valid economic activity associated with the use of subsoil within their seabed sectors up to the delineation line. Mineral resources of the structures crossed by the delineation line shall be developed on the basis of the international practice used in the development of transboundary fields, with authorized organizations appointed by the Government of the Parties. The Governments of the RF and the Azerbaijan Republic shall delegate to their authorized organizations rights for the development of mineral resources crossed by the delineation line determined by the Agreement within their seabed sectors/zones up to the said line of delineation. The authorized organizations of the parties shall, on the basis of the internationally-recognized practice of transboundary fields development subject to the consent of the Parties’ Governments, sign appropriate agreements on cooperation.

Agreement Between the Russian Federation and the Republic of Kazakhstan on Delineation of the Caspian Seabed for Exercising Sovereign Rights to Subsoil Use – signed on July 6, 1998. Pursuant to Article 1 of the Agreement, “The seabed and subsoil of the northern part of the Caspian Sea shall, while the water area
remains in common use, including provisions of freedom of navigation, agreed norms of fishing and environmental protection, be delineated between the Parties along the median line modified on the basis of the principle of justice and arrangement between the Parties. The modified median line shall be based on equidistance from the agreed base lines and shall be determined with due regard to the islands geological structures as well as other special circumstances and geological expenses incurred. Passage of the modified median line shall be determined by counting from the points on the shores of the Parties including the islands based on the Caspian Sea level as at January 1, 1998, equal to the mark of minus 27 m of the Baltic Height System (relative to the Kronshtadt gauge).”

On May 13, 2002, the presidents signed the Protocol to the aforesaid Agreement which establishes geographical coordinates of the Russia–Kazakhstan sea frontier in the northern part of the Caspian Sea. According to the Protocol, oil structure “Kurmangazy” (Kulalin) is under the jurisdiction of Kazakhstan, while the structure “Khvalynskoe” and the field “Khvalynskoe” fall under the jurisdiction of Russia. Both structures will be developed simultaneously.

**Agreement Between the Russian Federation, the Azerbaijan Republic, and the Republic of Kazakhstan on the Point of Junction of the Delineation Lines of the Contiguous Areas of the Caspian Seabed** – signed in Alma-Ata on May 14, 2003. The agreement determines the position of the point of junction of the delineation lines of the contiguous areas of the Caspian seabed with geographical coordinates 42°33′6 N and 49°53′3 E.

**Agricultural Afforestation** – a complex of planned establishment of forests to improve soil, hydrochemical, and climatic conditions of terrain, making it more favorable for further agriculture development. A.A. is a part of a wider system of phytoreclamation measures. It includes creation of field protection shelterbelts and afforestation of gullies, steep slopes, and sands. For the Caspian region, it is of special significance in view of progressing desertification and natural environment conservation.

**Agricultural Forestry** – a multipurpose approach to land use that includes growing perennial plantings (trees, shrubs, palms, bamboo, etc.) together with annual agricultural crops and cattle grazing. Thus, a single complex is formed with a certain spatial organization or with a temporary sequence of land use. The purpose of A.F. is improvement and maintenance of a certain level of land productivity and also diversification of agricultural production.

Ailag (Ailagy) – a gulf, or sometimes a bay, in the Turkmen coast of the Caspian Sea.

Akchagyl Layer, Akchagyl (from the name of Akchagyl stow on the Krasnovodsk peninsula in Turkmenistan) – the lowest division of the Upper Pliocene in the Caspian basin. Corresponds in time to the existence of the Akchagyl basin. On the territory of the Circum-Caspian lowland, clays prevail in the Akchagyl deposits. Their thickness in the Northern-Caspian depression varies from 100 to 350 m. A.L. was identified for the first time in 1902 by Academician N.I. Andrusov.

Akchagyl Relicts – the basis of the Caspian Sea fauna, they comprise more than 900 forms. They live in water with salinity of 14‰, multiply at a temperature of no more than 18°C, and avoid waters heated to more than 24°C. Their ancestors appeared in the Akchagyl basin approximately 3.4 million years ago at the ingress of cold sea waters with a salinity of 35‰ via the Kuma-Manych Depression. This event is marked by stenohalinic sea plankton foraminifers and zonal varieties of nannoplankton. Among A.R., conservative boreal and Arctic and adaptive Akchagyl relics are distinguishable.

Arctic relics of the Akchagyl time belong to genus that spread in the Arctic Ocean. They multiply only at a temperature lower than 10°C, except for Caspian seals. They include bristle worm, crayfish (p. Mysis, several species of sand hoppers, and isopoda crayfish), marine cockroach, and Nannoniscus caspius Sars. All other species of p. Nannoniscus live in the World Ocean with salinity of no less than 34.4‰ and a temperature no higher than 50°C. A fossil of the Arctic marine cockroach Saduria cf. sibirica of about 9.5 cm long was found in 1964 in the vicinity of the Inder Lake together with fossils of Akchagyl.

Boreal relics of the Akchagyl time belong to genus spreading in the Northern Atlantic Ocean and Barents Sea. They multiply only at a temperature lower than 18°C. They include all Caspian Bryozoa, Coelenterata, and bristle worm.

Adaptive relics of the Akchagyl time belong to the endemic genus and are the basis of the Caspian fauna of crayfish, mollusks, bristle worm, and saline-water fish (herring, bullhead, and marine pike perch). They multiply at a temperature of 10–18°C. A considerable number of the organisms in this group only grow in the wintertime, which is reflected not only in changes of their biomass but also in the isotopic composition of their shells. Adaptive relics evolved from extinct stenohalinic and cold-water Akchagyl intruders adapted to greater water salinity and higher temperature. For example, the ancestor of the Ponto-Caspian parasite leeches caspiobdella live in highly-saline waters of the Northern Atlantic. In 1995, a predecessor of the freely living leech Esmont was found only in the Laptev Sea. Several species of salt-water adaptive relics, such as mollusks (Bugskaya zebra mussels, bristle worm Hypaniola antique and Fadeev caspiobdella leech) also habitate in the Aral Sea and in the delta systems of the Black and Azov Seas. Along the Volga-Don Canal, several fresh-water Akchagal adaptive relics have intruded into the Volga River.
Akhtubinsk – a city and regional center in the Astrakhan Region, RF. It is located 292 km north of Astrakhan in the Circum-Caspian Lowland on the left bank of the Akhtuba R. Its population is 50 thou (2000). Founded in the first half of the nineteenth century for settlers and called Vladimirovka, it became a city in 1959 as a result of combining 3 settlements: Vladimirovka, the workmen settlement Petropavlovka, and the near-station settlement Akhtuba (a name given by location on the bank of the Akhtuba River). It contains the railway stations Vladimirovka and Akhtuba on the Volgograd–Astrakhan line. Automobile roads from Moscow to Astrakhan (on the right bank of the Volga) and from Volgograd to Astrakhan (on the left bank of the Volga) pass through A. Shipbuilding, ship repair, brick making, canning, milk plants, meat packing works, a bread-making plant are the industries here. A. is a haulage point for “Bassol” enterprises, which extracts salt from Baskunchak Lake. A memorial complex to aviation and deceased test pilots is also here.

Akhtubinsk A 9

Akchagyl Sea, Basin – the greatest basin of the Pliocene period, it included the Caspian Sea area which, via the Manych Strait, was connected with the Black Sea and deeply cut into the Volga and Ural interfluve at a level 100–150 m higher than the present one. It also covered the Aral Sea. It was a deep-water, saline, and cold sea, fauna from which intruded from the Caspian into the Black Sea.

Akhan, Okhan – an ancient large-mesh net for catching “red fish” in the Northern Caspian. A. consists of two layers, one with smaller-size mesh (4.5 cm), and the other with larger-size mesh (20–22 cm). Fish, having passed through larger-size mesh, reach the smaller-size mesh and become tangled in them.

Akhan Fishing, Fishery – a kind of fishing very popular on the Volga and Ural Rivers in the second half of the nineteenth century. The technique was to stake akhans, nets with large mesh made of thick hemp fiber, which had been lowered under the ice. A.F. lasted from late December through March. Cossacks crossed the ice cover for 30–50 km from the bank trying to put nets near ice edges where catches are most abundant. As a result, a great number of young sturgeons were caught. In 1895, such fishing was prohibited on the Ural River.

Akhmaz – (1) (Azeri – “drainless”) – a lake, meander lake, or old bed separated from a river during floods after the clogging by sediments of separate meanders in its bed. Usually, these are long and narrow water bodies of a horseshoe or loop-like form. Many such meanders are no more than 250 m long, and they are located close to the river itself. They are found in the lower reaches of the Kura River; (2) well expressed closed depressions with steep slopes, sometimes with lakes on the bottom; a pond, meander lake, or remnant of silted bed of the Kura and Araks Rivers (Azerbaijan).

Akhtuba – left arm of the Volga in the Volgograd and Astrakhan Regions, separating 21 km upstream of Volgograd. Its length is approximately 537 km. The old inlet into A. is dammed. A new canal 6.5 km long is dug from the Volga downstream.
Akkol (Kumyk. – “White lake”) – a lake in Daghestan located in the southeastern part of Makhachkala near the Reduktornyi settlement, 1 km from the shore of the Caspian Sea. Its length and width are 1.3 km, with a total area of approximately 1.3 km². As a result of sea level drawdown, water stopped flowing into it and the lake dried out. It was revived after the opening of the October Revolution Canal (COR), from which water was drawn to fill it again. It is used for common carp farming.

Aksaraisky – an urban settlement located 80 km north of Astrakhan on the right bank of the Akhtuba River (a branch of the Volga) in the Russian Federation. It was created in the course of construction and operation of the first stage of the Astrakhan gas processing plant.

Aksaraisky Gas Condensate Field – see Astrakhan Gas-Condensate Field

Aktam – an ancient name of the Uzboi River bed said to flow into the Caspian Sea. On the map made by A. Bekovich-Cherkassky in 1715 the river bed was shown with an inscription “Former mouth of Darya river “Aktam.”

Aktash – a small river in the piedmonts of Daghestan (156 km long). In summer it does not reach the Caspian Sea because water is withdrawn for irrigation purposes. Its watershed area is 3,390 km², and its slope is 14%. Its width in the upper reaches is 1.5 m, while in the lower reaches it is up to 160 m. The largest tributaries are Cyrkikal, Salasu, Yaryku, and Aksai. The river is recharged by both rain waters and ground waters.

Aktash Lakes – a chain of through-flow lakes and marshes located along the Aktash River, stretching for 55 km and from 1.5 to 8.0 km wide in the Republic of Daghestan. The area covered with water in abundant years is up to 8,500 ha with a depth of up to 1.5 m. A.L. are linked with the Caspian Sea via Agrakhan Bay.

Aktau – Northern and Southern (Turk ak – “white”, tau – “mountain”) – mountain ridge approximately 250–300 m high on the Mangyshlak Peninsula, Republic of Kazakhstan.

Aktau – name of the city of Shevchenko until 1964, at the center of the Mangistau Region (the Republic of Kazakhstan). Population: 152.9 thou. Formerly A. was called the town of Guriev–20, which was connected with the rich uranium deposit located in the well-known Karagie depression. Founded in 1963 when oil and gas fields were discovered and given the name A. In 1964, it was renamed in honor of Ukrainian poet T.G. Shevchenko (1814–1861) who, from 1850 to 1857, was exiled to fort Novopetrovskoye (later named Fort-Shevchenko) approximately 100 km to the north-west. In 1991, its original name was returned. It is a fishery base. Near A. there is a large oil and gas field. City is linked via railway with Makat station. There is an international airport. Mangistau Nuclear Power Plant was the world’s first industrial-scale fast reactor (BN-350). It was commissioned in 1973. Steam generated by this plant was used in power production and desalting of sea water.
Because of radioactive pollution, however, operations at Mangistau ceased. In 2000, an operation to remove nuclear fuel from the reactor began. Now the reactor is closed.

The water supply of the city is completely dependent on desalinated Caspian Sea waters. A desalinization plant with an output of 40,000 m$^3$ a day is planned. In general, perspectives on the city are connected with the development of hydrocarbons from the Caspian shelf.

**Aktau Marine Merchant Port** – constructed in 1963 and located 43 km northward of the Peschany Cape on the eastern coast of the Caspian Sea (the Republic of Kazakhstan), it is one of most important intermodal units in the transport infrastructure of Kazakhstan. The port bay forms a deep pocket protected on the west with a breakwater and on the southeast with a stony shoal. In the northern part of the port is an oil loading jetty, and on the eastern coast is an embankment for dry-cargo vessels. The width of a passage into the port is 300 m with a depth of 6 m. The port has land access by railroad, and is also linked with Aktau by an asphalt road. When the program to develop the Mangyshlak Peninsula as the fuel and power base of the northeastern Circum-Caspian area through development of uranium and oilfields on Mangyshlak was started, the small berths of the Aktau was used largely for receiving and shipment of building materials. The development of marine hydrocarbon deposits in the Mangistau Region, however, shaped the direction of the port’s utilization. In the mid-1970s, more than 6 million tons of crude oil were shipped from here every year. From 1968 to 2000 the port was rehabilitated at a cost of US$ 74 million (US$ 54 million were invested by EBRD and US$ 20 million by the Kazakh government). The port plays a key role in the export of Tengiz oil and dry cargo from Kazakhstan and is capable of handling 1.5 million tons of dry and 8 million tons of liquid cargo a day. Plans
have been developed to construct a container terminal, an additional grain terminal, a berth for ferroalloy transportation, etc. In 2000, a ferry terminal was commissioned that was the last link in the northern route of the TRASECA alternative. This enabled the opening of new international ferry lines, the Aktau – Nowshahr (Iran), the Aktau – Baku (Azerbaijan), and the Aktau – Olya (Russia). The Aktau – Olya line uses “Ro-Ro” ferries. Approval has been given for the creation of a special economic zone “Sea Port Aktau” (SEZ) to attract investments into the socio-economic development of the region, create new workplaces, and provide incentives for business activities. The main direction in SEZ activities is construction of hi-tech productions, transport, and other infrastructures. Ports in Aktau and Bautino have been operated by the Republic State Enterprise “Atyrau Marine Merchant Port (RSE “AMMP”).

**Aladja** – a port on the western shore of the Turkmen Bay to the north of the Aladja cape on the eastern end of the Dervish Peninsula in Turkmenia. It is a point of registry of the Turkmenbashi port. Passage into the port, which contains oil-loading and dry-cargo berths, is via a channel.

**Albania, Albanian State, Caucasian Albania, Alvania** – in ancient times, the Transcaucasian area along the banks of the Kiroš River (at present Kura) covering the territory of present-day Azerbaijan. Ancient Greek authors called it Ariaia, while Arabs called it Arran. The capital is Berdaa or “Caucasian Baghdad.” Via the Albanian Gates in the eastern part of the Caucasus, A. had communication with territories lying to the north of the Caucasus. V.V. Bartold wrote that “we have precarious and contradictory knowledge” about A., which lies near the Caspian Sea. He also mentioned that in 331 in the battle at Gavgamel when Persian troops were defeated by the Macedonians, an Albanian unit was among the warriors of the Median satrap. The Albanians were also mentioned as the people populating A., an area on the shore of the Caspian Sea that included Baku. It is assumed that Albanians are of the same origin as the Georgians and Caucasian highlanders who belong to the peoples called Japhetides.

**Albanian Gates** – see **Caspian Gates**

**Albanian Sea** – Pliny the Elder (First century C.E.) noted that “littoral people give many different names” to the Caspian Sea. “Further along the coast the Albanians . . . call their part of the sea the Albanian Sea.”

**Aleshrud** – a river flowing into the southeastern part of the Caspian Sea, near the western margins of the city of Makhmudabad in Mazandaran Province, Iran. For 300 m before reaching the sea, the river flows between dunes running parallel to the shore. The river’s width before its mouth is approximately 30 m, while in the mouth is no more than 10 m across.

**Alexander Bekovich-Cherkassky Bay** – formerly Alexanderbay. In 1959, by Resolution of the Presidium of the USSR Geographical Society, it was given the name A.B.C.; its former name was restored after 1991.
Alexander Wall, Alexander Rampart (Persian – *Sadd-e-Eskandar*, Turkmenian – *Kyzylalan*) – ruins of the historical wall located 30 km northward of the Gorgan mountain in the Holestan province of Iran. The wall stretches westwards of the Gombede-Kabus, and reaches within 5 km of the Caspian Sea, not far from the border with Turkmenistan (special permission is required to visit). It was supposedly built in the sixth century, which is why it cannot belong to the time of Alexander of Macedon. It served as protection from invasions of barbarians from the north.

Alexanderbay Bay – called Alexander Bekovich-Cherkassky Bay in the Soviet period, it is located between the Peschanyi and Zhiland (Gilyandy) capes in the southwest of the Mangyshlak Peninsula in the Republic of Kazakhstan. To the west, A. is not protected from the winds, but its eastern section is partially sheltered by the Sarzhinsky ridge. Its shores are flat, mostly sandy, and low-lying, with some low hillocks. Along the shore there are shoals, small islands, and both visible and underwater stones. Ranges of high reddish dunes gradually turn into sandy mounds as they run further from the coast. Near the top of A., 4.5 km northward of the Zhiland cape, the port of Kuryk (Yeralievo, Yeraly) is located.

Aligul – an extinct volcano located in the central part of the Chokhran plateau on the Cheleken Peninsula in Turkmenistan. It is a geological monument of nature.

Alikazgan – the name of the lower reaches of the Novyi Terek delta in Daghestan. In 1914, as a result of a catastrophic flood, the main Terek River bed was breached near Kargalinitskaya village, and since that time the source of the Novyi Terek is marked as the beginning of an active delta.

Alluvial Soils (synonym “floodplain”) – a grouping of soils that develop in river floodplains and deltas and which are periodically flooded during inundations, depositing on the alluvial plain. A.S. are very diverse by their morphological structure, texture, chemical composition, and water-air ratio. Types and subtypes differ by varying manifestations of such processes as sod gleyization, peat formation, and alluvium buildup. A.S. are divided into such types as alluvial-soddy, alluvial, alluvial-meadow, sod-gleyey, and alluvial-bog.

Alluvium – alluvial deposits (from Latin *alluvio* – “sediment, wash-on”) – deposits of permanent and intermittent water streams (rivers, springs) consisting of rolled and sorted debris material (pebble, gravel, sand, loam, and clay). A. of rivers running over flat terrain is divided into riverbed, floodplain and meander-lake. In mountain rivers, riverbed and pebble A. prevails. A. makes up floodplains and river terraces.

Amir Abad – a city on the southeastern coast of the Caspian Sea, located 10 km from the coast in the Mazandaran Province in Iran. It is connected via a railroad with the main railway line, the Tehran – Gorgan.
Amir Kolaie, Natural Preserve – located in the central part of the Caspian coastal zone in Gilan Province, Iran, eastwards of the city of Lengerud. The nature preserve area is 1,230 ha. It is represented by a complex of fresh-water lakes, marshes, and small and large ponds. Migratory birds spend winter within the territory covered by this natural preserve.

Amol – one of the most ancient cities of Northern Iran, in the Mazandaran Province. Located on the shore of the Kheraz River, 17 km southeast of the Caspian Sea, it was an administrative center that was connected via highways with such cities as Babolser, Tehran, and Makhmudabad. In the ninth century, Amol replaced Sari as the capital of Moslem Tabaristan.

“Amu-Darya” – An Iranian journal published since 1994 in English and consisting of 2 issues a year. Beginning in 1999 it was published quarterly by the Center for Studies of Central Asia and Caucasus (at the Foreign Ministry of the Islamic Republic of Iran) in Russian and English. It carries articles on issues pertaining to the politics, economics, culture, history, geography, sociology, ethnography, and linguistics of Iran and countries of Central Asia and the Caucasus.

Amudarya (from Amu – the name of city Amul (Amue, Amu, former Chardjou) on this river, Persian – Darya – a great full-flow river; Ancient Greek Oxus, Latin Oxus – Oks or Oksu, Arabic Djeikhun) – a river in Central Asia that is mentioned in the “History of the Northern courts” (Sixth century) and in later papers called “Uhu,” or in ancient Persian, “Veh-rud.” In the fourteenth to fifteenth centuries, the name Amudarya was used locally. A. flows over the territory of Tajikistan, Turkmenistan, and Uzbekistan. It originates in Afghanistan from the Vrevsky glacier at an altitude of 4,900 m under the name Vakhadjir, then it flows as Vakhhandarya until its confluence with the Pamir River, where it is called Pyandj. Downstream, at its confluence with the Vakhsh River, it gets the name Amudarya. It flows into the Aral Sea. Its length, by different estimates, varies from 2,540 to 2,620 km. Its watershed area is approximately 465,000 km², out of which only its mountain part (217,000 km²) generates flow. The main tributaries are in the mountainous part of the basin: Gunt, Bartang, Yazgulem, Vanch, Kyzylsu, Kafernigan, Surkhandarya, and Kunduzdarya. Downstream of the Surkhandarya, it goes out on the Turan Lowland, and as far as its mouth (1,200 km), does not receive any tributaries. In the lower reaches, it forms a delta with an area of approximately 10,000 km². The average natural flow of A. is about 78 km³ a year, all of which is completely regulated. Water is largely withdrawn for irrigation purposes, which is the main cause of the drying out of the Aral Sea, the level of which had dropped from 53 m in 1960 to 29.2 m in 2008.

A., in the basin of which were located such ancient states of Central Asia as Khorezm (in the river mouth), Sogdiana and Baktria (in its middle and upper reaches), has been known since ancient times. In the Neogene Era, a powerful river,
Anchovy Sprat (Clupeonella engrauliformis) – one of the species of small herring belonging to the genus of common kilka or Caspian sprat. Pelagic fish living in the Middle and Southern Caspian and even moving into the southern part of the Northern Caspian. It is not found in waters with salinity of less than 8‰. Populates open sea areas, avoiding depths less than 10 m. A.S. lives up to 8 years and grows quickly. It reaches maturity at the age of 2–3 years. Its body is cylindrical and thin, a predecessor of A. (Pra-Amudarya), flowed over the central part of the Karakum Desert to the west to the Caspian Sea. About 70 thousand years ago, it turned to the north and, having cut through a deep gorge nearby Tyuya-Muyun, reached the Khorezm Depression where a vast lake was formed. Great quantities of sediments gradually filled the lake, turning it into a flat plain. Approximately 10 thousand years ago, A. turned to the west and reached the Sarykamysh Depression, turning it into a lake. The fresh waters that filled the Sarykamysh partially flowed from it along Uzboi to the Caspian Sea. A sediment finally accumulated in the river delta, impeding its flow into Sarykamysh. About 4 thousand years ago or, by other sources, about 10 thousand years ago, A. again turned to the north and found its way into the huge Aral Depression that, as a result, formed the Aral Sea. As L. Gumilev noted, the first investigations in the Caspian Sea area were conducted by brothers-in-arms of Alexander of Macedon, the historian Aristobul and seaman Patrocle. They found that the Caspian level at that time was very low despite the fact that A. waters flowed into the Caspian Sea along the Uzboi. This was evident because at A.’s inflow into the Caspian waterfalls were formed, demonstrating that the absolute altitude of the sea was much lower than it is today.

Arab geographers of the Common Era Ibn-Khordebekh (approximately 847), Ibn-Rust (between 903 and 913), Masudi (died in 956), Istakhri (approximately 951), and Ibn-Khaukal (976) all confirmed that A., or Djeikhuna, flowed into the Aral Sea.

Amudarya-Caspian Route – a project designed to divert part of the Amudarya River into its former bed that flowed to the Caspian Sea in order to form a continuous waterway from the borders of Afghanistan over the Amudarya, Caspian Sea, Volga, and Mariinsky system to St. Petersburg and the Baltic Sea. Creation of such route was the major task of the large expedition headed by General A.I. Glukhovsky (1879–1883). This expedition prepared several projects on passage of the Amudarya waters to the Caspian Sea, both via the Sarykamysh depression and bypassing it, but at that time such projects were quite unrealistic.

Anadromous Fish – an ecological group of fish that migrate from saltwater seas to freshwater rivers to spawn. They feed in near-mouth areas of the seas.

Anchorage – a moorage place for a ship at some distance from the navigable channel that has no obstacles, even and slow currents, and sufficient depth. Such places are usually in the middle part of a convex shore in the deep pool area and the places specially that are reserved on the roads.
with a rounded belly and a keel that is only slightly visible. The upper part of the body is dark-blue with a greenish or olive tint. Its length is up to 13 cm, though a normal length is up to 8.6–9.0 cm. Average weight is 11 g. It has 44–48 vertebrae. In winter, A.S. is found mainly in the Southern Caspian at a depth of 50–750 m. In spring and summer, it moves to the north and amasses in great quantities in the Middle Caspian, keeping close to a thermocline zone at a depth of 15–60 m. It usually lays eggs in August–October in the open sea, mostly at a depth of 40–200 m and a water temperature of 13–24°C with a salinity from 8 to 12‰. It makes daily vertical migrations, rising at night to the surface, going deeper in the daytime. The fat content of the A.S. does not exceed 6.4%. It is the main feed for predatory fish of the Caspian.

Andiiskoye Koisu – a large tributary of the Sulak River in the Republic of Daghestan. It originates in Georgia from two small rivers, the Perikitelskaya and the Tushinskaya Alazan. The distance from the point of their confluence to the Sulak R. is 144 km, and its watershed area is 4,810 km² with an average slope of 13%. It receives 874 tributaries, out of which 828 have a length of less than 10 km.

Andreyev Shoal – located near the western coast of the Caspian Sea to the northeast of Kamen Ignatia Island. It was discovered in 1947 by A.I. Andreyev who, from 1939, was on service in hydrographical units on the Caspian Sea.

Andriyevsky Shoal – located near the western coast of the Caspian Sea to the northeast of the Shoulyan Cape in the Apsheron archipelago. It was discovered in early 1900 and was given the name of a fisherman who brought hydro-graphers into its area.

Andrusov Nikolai Ivanovich (1861–1924) – Russian geologist and paleontologist; Academician (1914); Member of the Ukrainian Academy of Sciences (1920); Professor of the Yuriev (since 1896) and Kiev (since 1905) Universities and Higher Women Courses in Petersburg (since 1912); and Member of the Geological Committee (since 1913). Conducted research related to dynamic and regional geology, stratigraphy, paleontology and oceanology. The founder of Russian paleo-ecology. His stratigraphical and paleontological works are devoted to studies of the Neogene and anthropogenic deposits. In the field of stratigraphy, A. applied both paleontological and paleo-geographical methods which enabled him to identify in the Neogene deposits of the Pontocaspian area the Meotic and Cimmerian stages as well as the Tarkhansky, Chokraksky, Karagansky and Konksky horizons. The stratigraphic scheme of marine deposits developed by him has not lost its significance. Being a participant of oceanographic expeditions to the Black Sea (in 1890) and to the Sea of Marmara (1894), he studied the Kara-Bogaz-Gol Bay (1897). He revealed hydrosulphide “pollution” of deep-water zones of the Black Sea and discovered on its bottom the remnants of the Caspian-typical Post-Tertiary fauna of mollusks. He was Laureate of the Lomonosov Award conferred by the Petersburg Academy of Sciences.
Anthropogenic Desertification – desertification caused by irrational economic activities of humans (overgrazing, destroying of vegetation, development of marginal lands, etc.). A.D. affects the Caspian shores in all littoral states. A vivid example of A.D. is “Black Earths” in the Republic of Kalmykia, Russia.

Anthropogenic Load – a complex of impacts produced by various kinds of economic activities on the natural environment.

Anzali (Enzeli) Bay (before 1980 – Pahalavi) – a vast shallow-water bay on the southwestern coast of the Caspian Sea in the Gilan Province of Iran. A.b. is separated from the sea by a western bar originating from the Dinchala settlement. The bay length reaches 65 km, and its width is about 22 km. It projects into the land for 15 km. The greatest length is about 40 km and its width is up to 3 km. A.b. is divided into 2 parts, eastern and western, and between them a small island is found near the southern coast. The western part is narrow (no more than 1 km wide) and long, while the eastern part is wider. Many small rivers flow from the south into the western part of the bay. The low clay island, Mian-Pushta (Mianposhte), is located at the inlet into the eastern part of the bay. One more island of a similar structure is found to the north. The strait between these islands and the bar is the deepest place in the bay. In the eastern part of the bay is found the Sefidrud River Delta. The arm of Sefidrud, Sparudbar, flowing through Resht City, runs into this part of the bay. To
the east of the Sparudbar Mouth, the bay becomes narrower. To the north is a strait connecting A.b. with the sea. The width of the strait is of 200 m, and near the sea it is obstructed by a wide bar. Port Anzali is located at the inlet into the bay. A fishery is developed here.

A.b. is a habitat for migratory birds as well as the spawning ground for chastik fish, in particular *R. frisii* (Black Sea roach). Salmon and other species of the “red” fish also run here. The water in the bay is practically fresh and only in the strait it is more saline. The strait linking the bay with the sea is called a river by the local population because the flow is directed mostly seaward, which is explained by the inflow of great quantities of water from the rivers flowing into the bay. A.b. is often called Murdab, which means “dead water” because of very calm surface of the water.

**Anzali Military Operation** – occurred on May 17–18, 1920 during the Civil War. The Soviet Volga-Caspian Navy and the Red Fleet of Soviet Azerbaijan under command of F.F. Raskolnikov as a result of successful military actions returned 23 Soviet ships taken away by foreign invaders and the White Army Guard to the Iranian port of Anzali, and, thus, ensured safe transportation of cargo over the Caspian Sea, making it easier for Soviet troops to complete the final liberation of the Transcaucasia and Turkestan.

**Apollov Boris Alexandrovich** (1889–1969) – Soviet hydrologist, Doctor of Engineering (1941), Professor (1935), Honorary Member of the USSR Geographical Society (1964). Beginning in 1926, he taught at institutes in Tbilisi and Moscow, and from 1944 was the chair of land hydrology of the geographical faculty of the Moscow State University. From 1919, he took part in investigations of the Caspian Sea and its basin. In 1938–1939, A. headed the Caspian expedition of “Centrmorproject” that studied specific features of ice conditions and physical properties of ice in the offshore areas of the Volga and the Volga-Caspian canal. In the late 1940 s, A. proposed to create “substitutes” of Kara-Bogaz-Gol by using other bays of the Caspian Sea. In the 1950s, under the guidance of A., the Institute of Oceanology of the USSR Academy of Sciences elaborated a scheme of reconstruction of the Caspian Sea on the basis of the project on construction of the North-Caspian reservoir. A. came to very interesting conclusions about the levels of the Caspian Sea for the period beginning from the first century B.C.

His main works are “Volga River Delta” (1928 together with V.V. Valedinsky); “Practical Hydrometry of Solid Flow” (1929 together with M.A. Lukashin); “Hydrological Information and Forecasts” (1945); “Teaching about Rivers” (1951); “Caspian Sea Level Fluctuations” (1956, a co-author); “Caspian Sea and its Basin” (1956); “Problems of the Caspian Sea” (1959, co-author and editor); “Hydrological Forecasts” (1960, co-author).

**Apraksin Fedor Matveevich** (1661–1728) – Russian general-admiral (1708) and comrade-in-arms of Peter I, he did much in the creation of the Russian fleet. In 1693–1696, he was a *voevoda* (Governor) in Arkhangelsk where he razed the old
shipyard and constructed a new one. After 1700, he took part in ship building on the Azov Sea as the Chief of the Admiralty division responsible for construction, armament, and procurement of the fleet in Russia. After 1707, he participated in establishment of the Baltic fleet, directed many military operations during the Northern War, won many victories over the Swedes, and commanded troops during the siege and capture of Vyborg (1710). From 1711 to 1723, he ruled Estland, Ingermanland, and Karelia, then, from 1714, he successfully commanded the galley fleet at Gangut, which, in July of that same year, won the first major victory on the sea in the history of the Russian fleet. After 1718, A. was the first president of the Admiralty Board, being the chief of the Navy Division of Russia. During the Persian campaign of 1722–1723, he commanded the Caspian fleet and supervised the construction of a port in Astrakhan. From 1723 to 1726, he was the commander of the Baltic fleet, and in 1726, he was the Member of the Higher Secret Council, a supporter of A.D. Menshikov.

**Apsheron** (formerly Zeinalabdin Tagiev) – a deep-water marine oil and gas field located 85 km from the Azerbaijan coast of the Caspian. Sea depth here is 450–500 m. The area of the oil- and gas-bearing structure is 400 km², and productive horizons occur at a depth of 4,800–7,100 m. The predicted oil reserves are 120 million tons, while gas reserves are 400 billion cubic meter. This field is being developed jointly by SOCAR (Azerbaijan), Chevron (USA) and Total (France).

**Apsheron Archipelago** – a group of islands and banks near the coast of the Caspian Sea to the east of the Apsheron Peninsula in the Azerbaijan Republic. Among them there are such islands as (as called before 1992) Artyom, Zhiloy, Bolshaya Plita, Lebyazhiy Kamen, Malaya Plita, Zhiloy-Urunos and others. The banks include Severnaya, Lebyazhiya, Karacheva, Andrievskogo, Darwina, Neftyanye Kamni, Filippova, Apsheronskaya, etc.

**Apsheron Bay** – an artificially created bay appearing after construction of a dam connecting the Apsheron Peninsula with Artyom Island. The length of the bay along a straight line from the dam to the parallel of the northern end of the Artyom Island is 9.1 km, with a width at its northern part of 4.6 km that gradually reduces to 1.4 km to the south. The area of the bay is 24 km².

**Apsheron Group of Health Resorts** – climatic and spa-mud health resorts and resort areas in the Republic of Azerbaijan located on the Apsheron Peninsula, which protrudes into the sea for 75 km. The surface is flat here (an altitude up to 165 m) with mud volcanoes (as high as up to 310 m) and salty lakes. The Apsheron group includes resorts Bilgyakh, Pirshaga, and Zagulba; climatic resort areas like Sarai, Fatmai, and Nardaran (northern coast of the peninsula); and resorts Buzovna, Shuvelyan and Mardakyan on the northeastern coast with the resort Shikhovo and the resort area Surakhany being on the southern coast. Many resorts and resort areas are a part of Baku; they are connected with each other and with the center of Baku, the distance from which is 10 to 40 km via highways and electrified railway. The
coastal zone near the health resorts has no industry (including oil and gas production complexes). Natural ventilation and abundant vegetation contribute to air purity in the resort area.

The climate here is dry, subtropical. Winter is mild, without frosts; the average temperature in January is 2–3°C. Spring is early and short. Summer is very warm and sunny with an average temperature in July–August of 25°C. Autumn is cool with prevailing cloudy and rainy weather. Annual rainfalls vary from 140 mm in the southwest to 250 mm in the north. Relative humidity is from 60% in summer to 80% in winter, and the number of sunshine hours is 2,800 a year. Quite often, strong northern winds, called “Baku Nord” (Khazri), blow.

The main natural curative factors that intensify the climatic-thalasso therapeutic effect gained from a soft climate, warm sea, and over 100 km of sand beaches (a bathing season from May 15 through September 15) are the sulfide and iodine-bromine mineral waters in Surakhany, Shikhovo, and Bilgyakh and the sulfide silt mud of salty lake Masazyr. Curative mud is applied in the Apsheron health resorts and in other health-improvement establishments of the Republic. Mineral waters from the Apsheron springs are also used in all Apsheron resorts (mostly for baths and for inhalations). The ailments such treatments at the Apsheron resorts are prescribed for are cardiovascular diseases, diseases of respiratory organs (including tuberculosis), functional disorders of the nervous system, ambulatory diseases, peripheral nervous system, and gynecological problems.

**Apsheron Layer, Apsheron** (named for the Apsheron Peninsula) – the Upper Pliocene layer of the Caspian basin, its existence was proven in 1923 by Andrusov. After revealing glaciation that was dated to the Apsheron Time in the Caucasus, some researchers thought it appropriate to classify A.L. in the Quarternary system. The border of the Neogene and Quarternary systems in the former USSR was traditionally put between A. and Baku layers of the Caspian Region at 0.7–0.8 million years; however, the International Geological Committee long ago decided to date this border as 1.8 million years, which corresponds to the border between Akchagyl and Apsheron of the Caspian Region. This corresponds to the time of the existence of the Apsheron basin. A.L. is characterized by interbedding of thick sandy deposits with clay ones. The thickness of its deposits is 400–600 m.

**Apsheron Peninsula** (from Persian *ab* – “water” and *shiron* – “sweet, fresh”; or *ab* – “water” and *shoren* – “solonchak”) – named after the small settlement Apsheron that existed till 1720s. In ancient times, it was called “Bab al-Abvab.” At first it was named “Apsheron Cape.” It is at the eastern end of the Caucasus Ridge within the Azerbaijan Republic, and protrudes for 75 km into the Caspian Sea. Its width is up to 30 km. The surface is a rolling plain with some mud volcanoes and mildly sloping closed, drainless depressions in which solonchaks and salty lakes lie. Its altitude is 50–165 m. A.P. is composed of sedimentary Tertiary and Quarternary deposits of considerable thickness, and is one of the oldest oil-bearing