

CAUCASUS HISTORY – Science

Overview

Scientific studies began in the Caucasus states around the 6th century through the contact with Byzantine and later Muslim culture. In the Middle Ages, the scientific and creative thinking reached its apogee and fruitful researches were conducted by the scientists in the Caucasus in medicine, astronomy, mathematics, astrology and other sciences. In the 16th and 17th centuries, with the advance of the Russian Empire and upheavals and conquests that accompanied it, slowed down scientific advancement in the region. Under the Soviets, science, culture, and the economy began to improve rapidly, and scientists from the nations of the Caucasus made important contributions in numerous fields. New industrial facilities, hydroelectric stations, railroad networks were built throughout the country.

POST-CLASSICAL PERIOD

SOUTH CAUCASUS:

GEORGIA: There were Muslim scientists in Georgia who worked at the Maragha Observatory which was founded in the 13th century.

Fakhr al-Din al-Khilati: Khilati was a mathematician, philosopher and astronomer. He developed the Tusi couple for medieval planetary theory in 1247.

Abul Fazl Hubaysh Tiflisi: Hubaysh was an astronomer who had two works on astronomy written in Persian: Introduction to the Study of the Stars and Description of the Stars.

Abuserisdze Tbeli: Tbeli was a theologian and astronomer who worked at the Maragha Observatory, and also made important contribution to astronomy.

King Vakhtang VI of Kartli: King Vakhtang's book *The Book on Mixing Oils and Making Chemistry* made a considerable contribution to the field of chemistry in the 17th century.

Alexander Batonishvili: Alexander was the first commander of artillery in Georgia. He wrote the first study of artillery science which was used as a manual in the Georgian army.

ARMENIA: According to Armenian historians Movses Khorenatsi and Elishe, the Armenians made medical discoveries in the 7th century. The natural sciences successfully continued to develop in the next centuries.

Mkhitar Heratsi: Heratsi was an Armenian physician who wrote the book *Relief of Fevers* in 1184, an encyclopedic study which included issues related to diet, surgery and psychotherapy.

Amirdovlat of Amasia: Amirdovlat was a physician who wrote books on medicine and science in the 15th century. He was the author of the books *The Lore of Medicine* (anatomy, pathology, hygiene) and *Akhrabadin* (pharmaceutics).

Anania Shirakatsi (Ananias of Shirak): Shirakatsi was a mathematician and the founder of astronomy in Armenia. In his *Knnikon* (Canon) he shows his fascination with the theoretical and practical questions of medicine in the 17th century.

AZERBAIJAN:

Seyid Yahya Bakuvi: Bakuvi was a scientist and philosopher who authored numerous works on philosophy, astronomy and math. His famous philosophic works were *Sharkh-I Gulshani-raz* (Comments to flower garden of secrets) and *Asrar at-Talibin* (Secrets of searchers of the truth).

Nakhchivani Najmaddin ibn Ahmad ibn Abubakr ibn Mohammad: Ibn Mohammad was a philosopher who worked in the Maragha observatory. He did researches on the problems of peripatetic philosophy, logic and nature.

Fazil Faridaddin Shirvani: The astronomer Shirvani dedicated his life to the study of heavenly bodies and gathered several grids of the celestial sky.

Nakhchivani Mohammad ibn Hindushah ibn Sanjar ibn Abdullah al-Girani an-Nakhchivani: Al Girani was a scientist who authored two works. The first was *Sihah al-fors*, completed in 1328, a dictionary of 2300 words and phrases in Farsi language. His second work was *Dastur al-katib fi tayin al-maratib* (The Instructions for the secretaries to determine the degrees) written in 1366. The book covered the entire range of social, legal and military topics that a high-level bureaucrat would need to know.

Discussion/Questions

- 1- What was the political benefit of the invention of the Armenian alphabet?
- 2- How did the Azerbaijanis benefit from the adoption of Arabic alphabet?

Readings

- 1- Coene, F., *The Caucasus An Introduction*, Routledge, 2010.
- 2- Khachikyan, A., *History of Armenia, A Brief Review*, Edit Print, 2010.
- 3- Jaimoukha, A., *Chechens A Handbook*, Routledge, 2005.
- 4-Simonia, I., "Little known aspects of the history of Georgian astronomy", *Journal of Astronomical History and Heritage*, May 2001, 4, pp. 59-73
- 5- Akhundova, N., *The History of Azerbaijan, "Short course of lectures"*, Baku Business University, 52018.
- 6-Zardabli, I. B., *The History of Azerbaijan: from ancient times to the present day*, Rossendale Books, 2004.
- 7- *Historical Dictionary of Georgia*, The Scarecrow Press Inc., 2007.
- 8- *Edge of Empires, A History of Georgia*, Reaktion Books, 2017.
- 9- Petrosyan, S., "David The Invincible: Philosophy as A Lifestyle", *UDC 1(091)*, 2(7), 2016.

EARLY MODERN PERIOD

SOUTH CAUCASUS

GEORGIA: In the 18th century, new Georgian printing press was created to print books in Georgian.

Artillery Science: Vakhtang VI wrote a manual for artillery science in Georgian later used as a in the Georgian army.

Astrology: Vakhtang VI studied astrology, authored a Persian-Georgian dictionary of astronomy, and translated from Persian *Ziji* and *The Book of Creation*. He also wrote two books *Khelta* and *Kvinklos*.

Veterinary Science: Georgian prince and scholar *Bagrat Batonishvili* authored first veterinary study *Samkurnalo tskhenta da skhvata pirutkvta* in Georgian which laid the foundation for veterinary science in Georgia.

Schools of Kartvelology and Rustvelology: Georgian historian and philologist *Teimuraz Bagrationi* founded schools of Kartvelology and Rustvelology. His books included *History of Georgia* (1832), *History of Ancient Colchis* (1840), and *The Knight in the Panther's Skin* (1843).

ARMENIA:

Zakaria of Agulis: Zakaria authored a manuscript called *Patmut'awn T'agayori Parsits'* (History of the Persian King) written in Armenian.

Abraham Yerevantsi: Yerevantsi was a historian known for his works the *History of the Persian king* and the *History of the Wars fought by the Ottomans over Armenian and Persian cities*.

AZERBAIJAN: In the 18th century, science was developing under difficult circumstances. There was an essay entitled *Khanadane Sefevi* on Safavid period written in the Azerbaijani language.

Molla Muhammed al-Cari authored *Chronicle of Car in 18th century* and talked about the struggle of the Carians against Nadir Shah.

Mohamməd ibn Nasireddin Tusi: Tusi was an scientist who wrote the books *Shakklul-gita* (Booklet on undivided polygonal), *Ziji-Ilkhani* (Astronomic tables of Ilkhanis), *Jameul-hesab* (Collection of calculation on with the help of blackboard and dust) and many others.

Questions:

1- What does the fact that science in the Caucasus continued to develop despite difficult circumstances, say about the importance of scientific inquiry?

Readings:

- 1- <https://ottomanhistorians.uchicago.edu/en/historian/zakaria-agulis>
- 2- http://lib.bbu.edu.az/read.php?item_type=lecture&file_type=pdf&file=312
- 3- <http://kartvelologi.tsu.ge/public/en/arqive/3/4>
- 4- Mikaberitze, A., *Historical Dictionary of Georgia*, The Scarecrow Press, Inc., UK, 2007
- 5- Roudik, P. L. *Culture and Customs in the Caucasus*, Greenwood Publishing, 2008.
- 6- http://science.org.ge/?page_id=2491&lang=en

19TH CENTURY

SOUTH CAUCASUS

GEORGIA:

Bagrat Batonishvili: In 1807 and 1818, Bagrat Batonishvili (Bagrationi) published several veterinary treatises, including *Samkurnalo tskhenta da skhvata pirutkvta*, that in effect laid the foundation for veterinary science in Georgia.

Petre Melikishvili: Melikishvili developed Stereochemical Theory. Melikishvili found one of the classes of organic compounds *Glycidacids*.

Michael Hospital: This was a medical center which was built in 1868 and provided medical service for the whole Caucasus. Many Georgian physicians like M. Chiangyan and S. Alexi-Meskhishvili continued to work on traditional folk medicine.

The first *Observatory*, *the Caucasian Museum* and *the Botanical Garden* founded in the 19th century transformed into a large scientific institutions and became parts of the Academy of Sciences of Georgia.

ARMENIA:

Nersisyan School: This school was opened in 1824 by Bishop Nerses V Ashtaraketsi, and made great contributions to Eastern Armenian education.

Gevorkian Seminary: The Seminary was opened on 18 May 1869 at the Mother See of Holy Etchmiadzin by Catholicos Gevorg IV. The Gevorkian Seminary aimed at preparing teachers for the science of education, psychology, logic and philosophy.

Abbot Michitar: Michitar authored first vernacular grammar and he also published books in this new dialect of the Armenian language.

Khatchatour Abovian: Abovian was an Armenian philologist who made radical changes in the grammatical construction of classical Armenian and modernized it.

AZERBAIJAN:

Alexander Kasimovich: Kasimovich was an orientalist, historian and philologist. He wrote *Assab as-Sayyar* (Seven Planets) on the history of the Crimean khans from 1466 to 1737 and *The Study of the Uyghur* on the Ancient Uyghurs in 1841. His greatest historical work was *Báb and the Bábis: Religious and Political Unrest in Persia in 1848-1852*, which he published in 1865.

Zeynalabdin Shirvani: The Azerbaijani geographer Zeynalabdin Shirvani, in his *Riyadh as-Sayahat* (The Flower Garden of Journeys, 1827) talked about the countries he had visited in the East. *Hadaiq as-Sayahat* (The Gardens of Journeys, 1827) gave detailed description of the Middle East. In *Bustan as-Sayahat* (The Flower Bed of Journeys, 1832) Shirvani provided geographic, cultural and ethnographic information about the places he had visited. His philosophical *Kashf ul-Maarif* (The Discovery of Enlightenment) included beliefs and theories and his meetings with famous scholars.

NORTH CAUCASUS

CHECHNYA: In the second half of the 19th century, Umalat Laundaev authored his first historical and ethnographic work titled *The Chechen Tribe*.

Questions:

1- Did science develop in the Caucasus as a result of scientific developments in Europe?

Readings:

1- Hovannisian, R. G., "Russian Armenia. A Century of Russian Rule", *Jahrbücher für Geschichte Osteuropas* Neue Folge, Bd. 19, H. 1 (MÄRZ 1971), pp. 31-48.

2- Jaimaoukha, A.M., *The Chechens: A Handbook*, RoutledgeCurzon, 2005.

3- Georgia and Medicine <https://openheart.ge/en/georgian-medicine-history/>

4- Sarkiss, H.J., "The Armenian Renaissance, 1500-1863", *The Journal of Modern History* Vol. 9, No. 4 (Dec., 1937), pp. 433-448.

5- https://www.azerbaijans.com/content_644_en.html

6- http://science.org.ge/?page_id=2491&lang=en

20TH CENTURY

SOUTH CAUCASUS

GEORGIA:

Georgian Historical-Ethnographic Society: The Georgian Historical-Ethnographic Society was established in 1907. The Society's members worked on the identification and protection of ancient Georgian historical monuments.

During the Soviet rule, science, culture, and economy began to improve rapidly. New industrial facilities were built in Rustavi, Chiatura, Zestaponi, Batumi, and Tkibuli. There were Zemo-Avchala and Rioni hydroelectric stations were built, and the railroad network was expanded throughout the country.

The Menshevik government of Georgia established the Tbilisi State University in 1918 under the leadership of Georgian historian Ivane Javakhishvili. The Soviets also founded many institutes like the Georgian Polytechnic Institute, Georgian Agricultural Institute, Tbilisi Medical Institute, Tbilisi Academy of Arts etc.

The Faculty of Medicine of Tbilisi State University was built in September 1918 and many famous Georgian scientists and doctors studied in this University were M. Tsinamdzgrishvili, V. Asatiani, K. Eristavi, V. Zhghenti, A. Tsulukidze, Av. Zurabashvili, P. Sarajishvili, and S. Khechinashvili.

In 1941, the Georgian National Academy of Sciences was established by a resolution of the Council of People's Commissars of the Georgian SSR.

After the collapse of the Soviet Union, scientific researches significantly dropped due to lack of funding for the development of science by the Georgian government.

Arnold Chikobava: Chikobava was a linguist and philologist. He was one of the founders of the Georgian Academy of Sciences. He was the opponent of Nicholas Marr's monogenetic "Japhetic" theory of language.

David Lordkipanidze: Lordkipanidze conducted excavation at Dmanisi and discovered the hominin fossil (skulls of an early hominin) named *Homo georgicus* (reclassified as *Homo erectus*).

ARMENIA:

Khachatour Koshtoyants: Koshtoyants was a physiologist who studied the theoretical foundations of evolutionary physiology and the problems of the evolution of functions of the organisms. In addition, he conducted research on the subject of neurotransmission.

Mikhail Chailakhyan: In 1936, Chailakhyan introduced the existence of a universal plant hormone, *florigen* in flowering. He worked on the agricultural applications of phytohormones and synthetic analogs.

Ezras Hasratyan: He was a neurophysiologist studying higher activity within the nervous system. He was well-known with his theory of adaptability of the nervous system.

AZERBAIJAN:

Mirali Seyidali oglu Qashqai: Qashqai was a geologist, who worked in the field of geomorphology and stratigraphy. He made valuable contribution to the studies of petrology and mineralogy studies in Azerbaijan.

Farman Gurban oglu Salmanov: Salmanov was a geologist who discovered big oil fields in Western Siberia in Tyumen Oblast in 1961.

Hajibey Farajulla oglu Sultanov: Sultanov was an astronomer and former head of the *Shamakhy Astrophysical Observatory*. Sultanov's main works tackle celestial mechanics and the genesis of the Solar System, as well as the origin, structure and evolution of the asteroid belt and minor planets. Sultanov developed the hypothesis that a ring of minor planets formed as a result of successive disintegrations of few larger primary bodies that emerged at the beginning of the evolution of protoplanetary material.

Ashraf Iskandar oglu Huseynov: Huseynov was a mathematician who made contributions to the studies of nonlinear singular integral equations, differential equations, potential theory and functional analysis.

NORTH CAUCASUS

CHECHNYA:

Vazif Meylanov: Mevlanov authored a mathematical theory of real-variable function "Sequences of closed sets of bounded variation converging in the deviation metric" published in 1974.

Questions:

1- Why after the demise of the Soviet Union, scientific researches significantly dropped in the Caucasus states?

Readings:

- 1-<http://kartvelologi.tsu.ge/public/en/arqive/3>
- 2- Boryskina, Y., "In focus: Georgia", *Cell Cycle*, 9:19, 3848-3850
- 3- http://science.org.ge/?page_id=2491&lang=en
- 4- Jaimaoukha, A.M., *The Chechens: A Handbook*, RoutledgeCurzon, 2005.
- 5- Georgia and Medicine <https://openheart.ge/en/georgian-medicine-history/>
- 6-https://www.azerbaijans.com/content_644_en.html